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WATER SUPPLY FROM A SOMETIMES DRY STREAM

Reservoir Impounds Flow During Seven or Eight Months to Furnish Supply During Four or Five Dry Months—Trench Excavation by Machine—Rapid Pipe Laying—Dam Construction.

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PLACING CONCRETE IN CONSTRUCTION OF SPILLWAY.

Le Roy, a town of 4,000 people in western New York, has just passed through the most satisfactory year in its history from a water supply standpoint and, what is somewhat unusual, its supply, which was put into operation about the first of April, 1916, is obtained from a reservoir on a small brook which in many years is completely dry for about four or five months of the year. In fact, in the construction of the reservoir, the contractor had to pump water to mix his concrete from a stream four miles distant.

Previous to April, 1916, water was obtained from wells and the water thus obtained was too hard to use for most domestic purposes, and in the dry summer and fall months the supply was entirely inadequate.

The new supply was obtained by the construction of an earthen dam across the brook about six miles south

of the village. The reservoir created has a capacity of 175,000,000 gallons of which 145,000,000 is above the outlet pipe and can be used by the town if necessary. The drainage area of the stream is only one and one-half square miles, but in the spring of the year there is always sufficient runoff, even in an extreme low year, to supply 700,000 gallons of water per day from the natural runoff and in addition fill the reservoir; so that this supply can be maintained for a six months' dry season, with a liberal allowance for evaporation even if no water came into the reservoir. Seven hundred thousand gallons is about three times the present consumption, so that Le Roy is assured of an adequate supply for thirty or forty years to come.

The stream used for the supply has a drainage area a little over one and one-half square miles, and from records

of adjacent streams it was estimated that the average daily run-off for an entire year of extremely low rainfall would be about 900,000 gallons per day. This should be sufficient to furnish the daily supply and also to fill the reservoir, leaving it full at the latter part of May or June, when the flow of the stream diminishes. The capacity of the reservoir would then suffice for six months' supply at 700,000 gallons per day, besides providing for seepage and evaporation.

The year which has just passed was one of the driest that western New York has ever experienced, and in spite of this fact, only about 45,000,000 gallons of the 145,000,000 available were used. The reservoir is now filling up again.

At the site selected for the dam the soil is a heavy clay underlaid by shale rock, the rock being sixteen feet below the surface at the central part of the dam, but much nearer the surface at the ends. Near the stream bed the material was a sandy clay which required sheeting in the core wall trench, but near the ends of the dam the stiff clay stood up in the trench without bracing. A core wall was carried from one end of the dam to the other, being made two feet thick on top and with a batter of five-eighths of an inch to the foot on each side. An earth embankment was carried on each side of the core wall, ten feet wide on top and with a slope on the upstream or water side of three to one, and on the downstream side of two to one. Most of the material for the embankment was excavated from a borrow pit near the reservoir and loaded by an elevating grader directly into dump wagons, by which it was deposited in six-inch layers, watered, and rolled with a two-ton grooved roller. Rip-rap one foot thick was placed on the up-stream face of the dam down to the level of the outlet pipe.

The dam forming the reservoir is about 500 feet long and 32 feet high. A concrete core resting on bed rock extends along its entire length. The water passes from the reservoir to a rapid sand filtration plant directly in front of the dam. It is first aerated before passing through the filters, of which there are two, each having a normal capacity of 500,000 gallons per day. From the filters the water flows by gravity to the village through about five miles of fourteen-inch cast-iron pipe.

The trench for this pipe was excavated with an Austin trenching machine, except for one hundred feet of hard limestone rock in the bottom. This entire line was laid and backfilled in thirty-five days, an average of seven hundred and fifty feet a day. Something over one thousand feet a day of trench was the maximum rate of excavation, while 1,020 feet of pipe was the record for one day's construction.

Because of the long distance from the reservoir to the village, it was thought desirable to provide abundant storage close at hand for fire purposes, and a 130,000-gallon elevated tank was constructed, thus adding to the storage already provided by the standpipe, which had been erected twenty years previous, when the original water supply system had been constructed.

The entire new system, including real estate, cost about \$105,000. The interest on the bonds, taxes and the cost of maintaining the new system is slightly over \$6,000, which amount is less than the operating cost alone in pumping water from the old wells; and what is more, Le Roy now has an adequate supply of soft water free from any impurities and any odor or taste.

It is, to be sure, not a common practice, especially among small towns, to get their water supply from streams which go completely dry in the summer, but there may be many cases in which a community is laboring along with an inadequate supply of hard water obtained by pumping from wells, when an abundant supply

of soft water could be obtained near at hand by gravity, by storing the flood waters of a small brook not a great distance from the town.

The writer prepared the plans for the above work and supervised the construction; with Walter McGulloh of Niagara Falls as consulting engineer, and O. S. Hart as assistant engineer. The dam and concrete work on the filter plant were built by Morrison and Quinn, of Rochester, N. Y. The Norwood Engineering Company of Florence, Mass., designed and built the filter plant. The cast iron pipe was furnished by the United States Cast Iron Pipe & Foundry Company, and was laid by Charles Shepard, of Niagara Falls.

DIFFUSION OF SEWAGE IN SALT WATER

Experiments in Laboratory and in New York Harbor to Learn Conduct of Sewage Discharged Below the Surface.

In a paper before the Connecticut Society of Civil Engineers, in which he discussed the pollution of New York harbor and the remedies proposed, Kenneth Allen, engineer of sewage disposal of the Board of Estimate and Apportionment, described some interesting and instructive experiments made on the diffusion of sewage in water. This part of his paper was as follows:

Interesting experiments were made to observe the diffusion of sewage in harbor water, first with thirty-one experiments on a small scale in the laboratory, then with twelve in a tank about eight feet long and four feet deep in the New York Aquarium, and finally with thirty in the harbor itself.

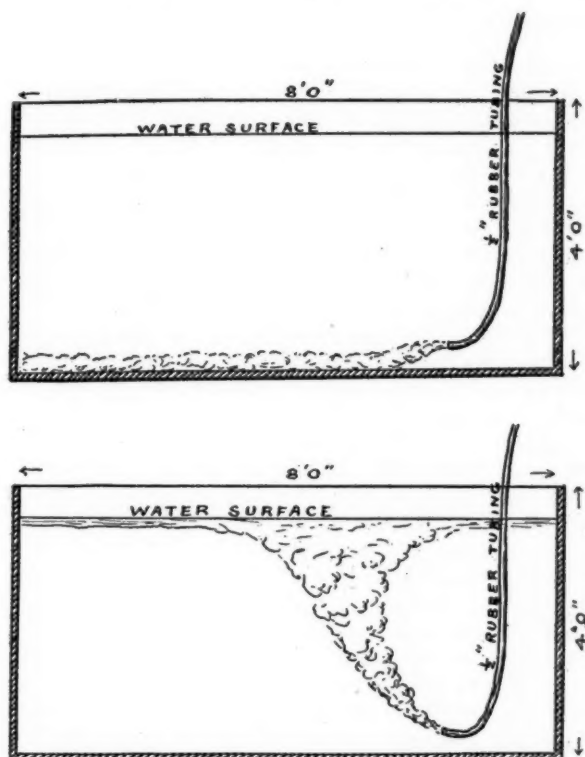
Either tap water or sewage colored with uranine or some other dye was injected at different depths and in different volumes into water of different degrees of salinity. As observed in the laboratory by dropping from a pipette or a fine drawn glass nozzle, some of the forms assumed were very beautiful. The form was usually an inverted cone, but circles resembling smoke rings, vertical columns of cumulus appearance, similar to the dense smoke rising from a burning oil tank on a still day, were noted. The form depended, of course, on the velocity of the jet and the relative density of the two liquids.

To show the relative rapidity of diffusion in waters of different degrees of salinity 30 cc. of sewage colored with 1/10000 part of uranine was discharged gently from a pipette on the surface of 3,000 cc. of the water in a Mason jar. When the jar held tap water only, diffusion began in a few minutes and was complete in an hour; when it contained 25 per cent of sea water, diffusion was not complete until forty-eight hours, with 50 per cent sea water not until fifty-six hours; and with 75 per cent sea water and 25 per cent tap water diffusion remained incomplete at the end of a week. The experiment brought out the great advantage, so far as diffusion is concerned, in a discharge of sewage into fresh water.

One of the most interesting of the Aquarium experiments consisted in the discharge of colored sewage into tap water from a 1/2-inch jet under a head of 0.15 feet in a horizontal direction at a depth of 3.4 feet—that is, at the bottom of the tank. The sewage first spread out in the form of a blanket about two inches thick over the bottom of the tank and then, after about three minutes, began gradually to diffuse. Within about a half-hour, diffusion was complete throughout the tank. When, however, the discharge was into salt or brackish water, the sewage rose in a cone to the surface, where it spread out in a thin layer and then diffused. This il-

illustrated clearly the tendency of sewage to remain near the bottom if discharged horizontally into fresh water until diffusion takes place.

In the thirty outdoor experiments the colored liquid was pumped to different depths at different points in the harbor and the appearance of the dye on the surface noted. When three and one-third pounds of uranine was dissolved and dumped in the harbor water it could usually be readily detected after flowing one and one-quarter miles in a current of two and one-half miles per hour. Two and one-half pounds could likewise be detected at this distance if the current were 1.6 miles per hour. If conditions of light were good, and unless greatly diffused the field of color was readily visible from the deck of a launch at a distance of 2,000 feet.



JET OF SEWAGE ISSUING IN FRESH WATER (UPPER SKETCH), AND IN BRACKISH WATER (LOWER SKETCH).

Most of these experiments were made by pumping a dilution of one part uranine in about 2,000 of tap water or sewage from large casks, holding in all about 1,000 gallons, through a $1\frac{1}{4}$ -inch hose to different depths with a velocity of six and one-half feet per second and noting the result at the surface.

At the proposed location of the Passaic Valley sewer outlet near Robbins Reef when the specific gravity of the harbor water was 1.020, a 1:500 solution of uranine pumped to a depth of forty feet was discovered at the surface.

On another occasion 16,500 gallons, having a dilution of 1:2750, was pumped through a $2\frac{1}{2}$ -inch hose to a depth of forty feet with a velocity of fourteen feet per second. The specific gravity of the harbor water at this time was 1.0125. No sign of the dye was, however, noted at the surface.

In a yet larger test 56,000 gallons of tap water containing 290 pounds of uranine were pumped from a pontoon through an eight-inch pipe to a depth of forty feet at a rate of 2,320 gallons per minute. The velocity of the current at a depth of three feet was 0.45 feet per second; at a depth of 20 feet, 1.03 feet per second, and

at a depth of fifty feet, 2.85 feet per second. At the point of discharge, forty feet below the surface, it was estimated at 2.2 feet per second. The specific gravity of the harbor water ranged from 1.015 at the surface to 1.018 at a depth of fifty feet, and the temperature was 72 degrees F. In spite of the large volume discharged this was not detected on the surface.

Several important conclusions are drawn from these seventy-nine experiments relative to the discharge of sewage into bodies of water.

In the first place the effluent will rise in still water toward the surface or fall, depending solely on the relative specific gravity of the two liquids. In sea or harbor water it will rise, while in upland water of considerable purity it will remain at the level of discharge or fall toward the bottom.

Immediately after its discharge sewage begins to diffuse and commingle with the surrounding water. This diffusion will take place more rapidly the less the salinity, and probably bears some relation to the volume, or exposed surface, of the effluent; but at this stage diffusion is of less importance than the mixing action or dispersion. The latter depends largely on the relative velocity of the sewage effluent and the stream into which it is discharged. If the current is rapid or with turbulent eddies the mixing will be rapid and may obliterate any buoyant effect due to the original specific gravity of the sewage. In equal mixtures of sea and upland water, however, sewage will rise and may be expected to reach the surface so as to be detected from depths up to thirty feet. From depths of from thirty to forty feet it is uncertain whether it will make its appearance. Much depends upon sub-surface currents. But at depths greater than forty feet it is not likely to be seen at the surface unless discharged in very large volumes.

In still water of from .004 to .016 greater specific gravity, sewage will rise at the rate of from 0.10 to 0.17 feet per second.

EXCAVATING WATER PIPE TRENCH BY MACHINE.

Scarcity of labor interfered with the work of the water department of Syracuse, N. Y., last year, especially with the laying of mains. Up to October only about one mile of mains had been laid. To meet this situation the city bought a trenching machine at a cost of \$4,400, which enabled the small force to lay $2\frac{1}{4}$ miles of main after October 1. With two men operating it, as much trench excavation was done as by 40 or 50 men digging by hand.

FT. WAYNE ASPHALT PLANT.

In his annual report for the year 1916 as superintendent of the municipal asphalt repair plant of Ft. Wayne, Indiana, W. H. Droege gives a brief but comprehensive statement of the work done by the plant.

During the year, 16,762 square yards of patches in asphalt pavement that were out of guarantee were put in at a cost of seventy-two cents per square yard. Of these, 9,180 square yards were repaired by use of surface heaters, 6,881 square yards were cut out, and 431 square yards were Tarvia X pavement repairs. The remaining 294 square yards were repairs in asphalt block pavement, using the surface heaters and repairing with a sheet asphalt mixture.

In addition to this public work, the plant laid for private corporations 461 square yards of sheet asphalt, 9 square yards of asphaltic concrete and 9 of new concrete pavement. Bills amounting to \$650.71 were made out for work done for private parties and the water department, much of this being for openings made in asphalt pavements by the department, plumbers and sewer contractors.

During 1914, 202,536 square yards of sheet asphalt pavement were out of guarantee and were maintained at a cost of 4.87 cents per square yard. In 1915 the amount out of guarantee had increased to 266,834 square yards and was maintained at a cost of 3.4 cents per square yard. In 1916 the pavement out of guarantee totalled 358,884 square yards (this including other kinds of bituminous pavement besides sheet asphalt), and these were kept in repair at a cost of 3.34 cents per square yard.

WATER CONSUMPTION DATA

Elements of Inaccuracy in the Figures of Many Cities—Domestic and Non-Domestic Consumption—Unaccounted For Water—Money Losses.

In probably the majority of waterworks departments, the fiscal year corresponds with the calendar year, and the superintendents and their assistants are now engaged in preparing the annual report. This report will probably contain figures assumed to show the amount of water consumed during the year, and, if it is a pumping plant, the amount of coal used and the duty developed by the plant. Probably other figures as well will be based upon those reported as the amount of water consumed.

Considering the millions of dollars invested in waterworks plants throughout the country and the hundreds of thousands spent every year in coal for pumping water, it would seem natural to expect that all of the elements affecting the efficiency of the several features of such plants would be quite accurately determined. No factor is more fundamentally important in waterworks economy than the amount of water handled, and it would therefore seem that such quantity should be made a matter of study and exact determination. As a matter of fact, probably nothing connected with waterworks operation, or in fact with almost any other public utility, has received less intelligent study than the matter of amount of water.

In 1914 the Committee on Water Consumption of the American Waterworks Association reported a number of figures collected by them from something over one hundred cities, which figures were presumably more accurate than are the general run of those reported, since

they contained data concerning the number of taps, number of meters, gallons per day of metered registration, the minimum night rate, amount used for industrial, commercial and public consumption, etc. An examination of the table in which these data were presented indicates that the present ignorance concerning consumption is not only a matter of difficulty in obtaining the information, but is largely one of carelessness concerning it. For instance, the minimum night rate is generally accepted as an approximate measure of leakage and waste in a system, and yet only about half of the cities reporting to this committee had any figures for night consumption.

This table also gives an indication of the importance of the matter of leakage. Of twelve cities included in it which meter practically all of their services and whose consumption figures are quite complete, nine reported 18 per cent or more of the water delivered to the mains as being unaccounted for, four reported 30 per cent or more, and one reported 72 per cent of the water as unaccounted for, which almost certainly indicates a very serious leakage from the mains. The one last referred to also reported that the minimum night rate was 84 per cent of the mean rate of consumption.

In this table the figures reported as consumption for industrial, commercial and public uses are given, and the difference between these and the total consumption is assumed to be domestic consumption. The figures for domestic consumption obtained in this way vary all the way from twelve gallons per capita per day to three hundred and four gallons. If twelve gallons is sufficient domestic consumption in one city, it is inconceivable that three hundred gallons can be required or even be used in another city. What the three hundred gallons means may be illustrated by the statement that all of the water required for drinking and kitchen uses could be drawn in each household, and in addition each member thereof would have six or seven bath-tubs full of water at his disposal each day. As the average size of household lies between six and seven, this would mean forty to fifty tubs full of water each day over and above all kitchen uses. We question whether there is any city in the country into the private residences of which this average amount of water flows day in and day out through the year. In other words, we simply

CONSUMPTION OF WATER IN IOWA CITIES IN 1914.

1 Name of City.	2 Estimated population in 1914.	3 Est'm't'd per cent of population reached by mains.	4 Est'm't'd per cent of population using water.	Total gals. per day.		7 Same as 6, less large consumers.*
				5 Per capita of total population.	6 Per capita of water users.	
Sioux City	50,000	80	66	56	84	84
Davenport	45,500	100	85	88	103	103
Waterloo	32,000	82	75	42	55	55
Burlington	24,000	95	90	95	105	97
Fort Dodge	20,000	90	90	55	61	...
Muscatine	18,000	69	50	71	141	134
Keokuk	16,000	90	75	83	111	107
Iowa City	14,500	80	75	120	160	154
Mason City	16,000	81	56	55	98	66
Marshalltown	14,000	100	99	114	115	60
Boone	12,000	40	40	94	235	138
Creston	8,000	75	45	75	167	154
Charles City	7,000	70	64	47	73	49
Cedar Falls	7,000	95	78	67	88	88
Cherokee	5,000	90	67	36*	43*	51*
Red Oak	5,000	100	100	60	60	...
Le Mars	5,000	95	90	150*	167*	160*
Clarinda	4,500	75	67	30*	44*	44*
Waverly	4,000	75	50	41*	82*	62*
Spencer	4,000	67	50	38*	75*	75*
Sheldon	3,200	78	62	...	...	...
Algona	3,200	78	62	28*	45*	45*
Osceola	2,800	43	32	14*	44*	...
Sac City	2,700	74	74	28	38	38
Storm Lake	2,500	95	75	80*	106*	77*
Villisca	2,300	35	35	12*	34*	30*
Rockwell City	1,800	49	49	47*	93*	61*
Sibley	1,700	100	35	34*	83*	83*
Spirit Lake	1,700	59	41	41*	100*	80*

*Consumption estimated only.

†In calculating this column the total consumption was diminished by subtracting from it the amounts used by railroads large manufacturing consumers.

do not believe that any city in the world actually delivers to its domestic consumers an average of three hundred gallons per capita per day.

There are two possible explanations of such high figures; one, that they include enormous underground leakage from the distribution system; the other, that the figures for total amount of water delivered to the distribution system are incorrect. In the majority of cases we believe both factors enter into the mistake. In the city just referred to with the per capita domestic consumption of three hundred gallons, the total per capita consumption for all purposes was given as three hundred and thirty-three gallons, about thirty gallons being

metered non-domestic consumption. This water was supplied by pumping, and the amount delivered to the mains was based upon the number of strokes of the pump and the rated capacity of the pump, *no allowance whatever being made for slip*. We question very much whether there is any pumping plant in the country which operates for an entire year with an average slip of less than 2 or 3 per cent; 8 or 10 per cent is probably more near the slip to be found in the average municipal pumping plant, while as high as 75 per cent has been actually measured in such plants. In this particular city, one hundred and fourteen of the dwellings were metered, and the average consumption per domestic meter was

ANALYSIS OF WATER CONSUMPTION IN 72 CITIES IN 1914.

From Report of Committee on Water Consumption of the American Water Works Association.

City	Population	Per cent of services metered	Per cent (minimum night rate is of day rate.	Consumption per capita per day				
				Total.	Indus- trial.	Com- mercial.	Public.	Do- mestic.*
St. Louis, Mo.	730,000	6.7	73.0	112.5	19.7	12.2	1.6	79.0
Buffalo, N. Y.	450,000	4.9	....	309.0	....	92.0	....	217.0
Milwaukee, Wis.	430,000	99.4	62.5	111.4	41.4	32.0	5.6	32.4
Havana, Cuba	400,000	0.7	80.0	137.5	2.5	....	....	135.0
New Orleans, La.	360,000	99.7	....	57.2	9	13.0	3.2	41.0
Washington, D. C.	353,000	58.9	74.0	162.7	17.8	10.7	2.6	123.6
Rochester, N. Y.	250,000	99.5	42.0	95.0	18.3	12.2	4.8	59.7
Denver, Colo.	220,000	0.67	....	197.0	7.0	0	10.0	180.0
Louisville, Ky.	214,000	11.0	47.0	119.3	....	....	....	72.3
Memphis, Tenn.	175,000	58.7	55.0	83.0	1.6	....	1.4	80.0
Richmond, Va.	120,000	75.2	....	115.5	32.2	27.4	12.4	43.5
Fall River, Mass.	115,400	97.8	....	46.2	6.8	+	11.8	27.6
Spokane, Wash.	104,400	44.0	....	286.1	4.0	1.8	14.3	266.0
Salt Lake, Utah	100,000	6.5	41.0	186.2	50.5	+	....	....
Utica, N. Y.	95,000	99.3	....	78.7	41.9	....	2.2	34.6
Grand Rapids, Mich.	90,000	46.7	39.0	176.0	48.0	....	0.4	127.6
St. Joseph, Mo.	89,400	17.4	....	101.0	40.4	8.2	3.9	48.5
San Diego, Cal.	85,000	100.0	....	80.6	7.2	12.1	9.6	51.7
Wilkinsburg, Pa.	80,000	99.0	....	107.0	59.6	....	2.4	45.0
Passaic, N. J.	75,900	60.7	55.2	62.0	16.8	....	0.5	44.7
Portsmouth, Va.	75,000	8.1	....	64.9	19.9	1.7	1.3	42.0
Erie, Pa.	72,000	3.0	70.0	218.0	65.0	....	....	153.0
Holyoke, Mass.	60,000	9.5	52.2	113.0	16.0	11.5	3.5	82.0
Allentown, Pa.	55,700	0.7	63.0	141.9	3.4	1.5	....	137.0
Altoona, Pa.	55,500	5.15	....	37.3	6.2	7.1	....	24.0
Wichita, Kans.	54,545	43.5	....	70.0	2.1	7.8	1.3	58.8
Elmira, N. Y.	52,000	48.4	33.0	115.0	20.0	....	....	95.0
Buffalo, suburban, N. Y.	50,000	100.0	....	131.5	98.5	....	....	33.0
Macon, Ga.	42,500	54.0	34.6	115.0	....	....	....	84.3
Racine, Wis.	41,000	72.8	....	84.0	27.0	7.7	2.3	47.0
Lexington, Ky.	40,000	100.0	42.5	62.1	18.0	16.0	8.4	19.7
Williamsport, Pa.	40,000	1.4	....	150.0	31.0	....	....	119.0
Quincy, Ill.	38,590	63.8	....	50.0	16.4	5.6	2.0	26.0
Auburn, N. Y.	36,360	9.0	68.7	180.0	20.1	12.6	7.3	140.0
New Castle, Pa.	36,000	77.7	....	98.2	23.2	6.3	0.7	68.0
Waterloo, Ia.	32,000	95.4	34.0	41.8	13.0	....	2.8	26.0
Muncie, Ind.	30,000	23.8	....	97.2	16.6	6.2	0.6	73.8
Saginaw, Mich.	29,600	4.1	....	333.7	22.3	7.4	....	304.0
Ft. Smith, Ark.	28,000	26.6	....	90.4	5.1	17.0	2.3	66.0
Madison, Wis.	27,000	99.2	14.1	79.0	6.1	6.5	3.4	63.0
Oak Park, Ill.	26,000	100.0	44.5	69.0	8.6	1.7	2.5	56.2
Clinton, Ia.	25,500	62.2	....	61.4	6.1	4.6	2.7	48.0
Burlington, Ia.	24,320	4.5	56.0	92.6	....	....	....	56.0
Richmond, Ind.	23,000	65.0	....	113.7	39.4	7.8	10.7	55.8
Fort Dodge, Ia.	20,000	96.0	30.0	50.0	8.0	....	....	42.0
Hagerstown, Md.	20,000	12.1	41.0	122.2	61.0	13.2	1.2	48.0
Kokomo, Ind.	20,000	8.6	....	97.5	11.2	2.6	1.2	82.5
Beloit, Wis.	18,000	84.1	....	31.7	5.2	4.1	....	....
Port Arthur, Ont.	18,000	14.7	....	145.0	....	....	....	105.0
St. Catherine, Ont.	17,000	3.15	....	161.0	44.0	6.0	....	111.0
Clarksburg, W. Va.	16,000	1.5	50.0	158.0	62.0	....	....	96.0
Pine Bluff, Ark.	16,000	100.0	83.8	71.6	....	....	....	64.0
Elyria, O.	16,000	100.0	38.3	121.1	47.0	7.2	5.6	61.3
Sunbury, Pa.	15,000	2.7	36.5	228.0	125.4	4.0	....	98.6
Corning, N. Y.	14,900	99.0	16.0	83.3	16.7	7.2	1.4	58.0
Marquette, Wis.	14,610	4.1	....	93.3	5.7	2.3	0.3	85.0
Keokuk, Ia.	14,000	64.5	....	105.0	10.5	7.3	1.2	86.0
Streator, Ill.	14,000	10.6	70.0	131.0	41.0	....	3.6	86.0
Jefferson City, Mo.	13,500	34.4	35.7	99.0	53.2	4.0	4.0	37.8
Ashland, Wis.	12,000	28.0	41.0	106.0	23.0	....	5.0	78.0
Merrill, Wis.	9,690	....	....	104.5	0.5	0.3	0.7	103.0
Scottsdale, Pa.	8,500	3.5	14.5	244.0	56.2	1.3	0.8	185.7
Eveleth, Minn.	8,000	4.0	....	76.1	....	....	32.1	44.0
Walkerville, Ont.	7,500	8.3	46.5	375.0	164.0	....	8.1	202.9
Brunswick, Me.	6,000	94.0	30.0	76.0	31.0	4.0	....	41.0
Mt. Vernon, Ind.	5,800	9.0	....	126.8	14.4	1.6	2.8	108.0
Louisiana, Mo.	4,860	15.8	....	97.7	19.6	1.6	1.5	75.0
Ripon, Wis.	3,800	17.3	47.0	76.2	4.4	3.3	1.5	67.0
Edgeworth Water Co.	3,360	98.4	33.3	106.6	22.1	0.3	1.2	83.0
Monroe, Wis.	3,000	100.0	56.0	79.0	38.5	....	....	40.5
Plattsburgh, Neb.	2,700	36.4	....	90.5	....	....	....	63.0
Manchester, Vt.	1,500	69.0	....	43.0	9.5	2.6	2.0	28.9

*These figures include also the unaccounted for water, being obtained by subtracting from total consumption the sum of industrial, commercial and public consumption.

†Included in industrial.

‡Included in domestic.

§Included in commercial.

Of the above, those metering more than 99 per cent of their services, with the percentage of the supplies unaccounted for, were as follows: Buffalo suburbs, 18 per cent; Elyria, 18 per cent; Lexington, 5 per cent; Madison, 36 per cent; Monroe, 9 per cent; New Orleans, 37 per cent; Oak Park, 6 per cent; Pine Bluff, 72 per cent; Rochester, 30 per cent; San Diego, 19 per cent; Utica, 18 per cent; Wilkinsburg, 18 per cent. Combining all these cities, 29.1 per cent of the consumption was domestic, 52.8 per cent was non-domestic, and 18.1 per cent was unaccounted for.

two hundred and seventy-three gallons, which would indicate less than fifty gallons per capita. While the metered consumption can not, of course, be taken as indicating what the unmetered would be, it seems to us improbable that the difference between the two would be as great as indicated by the figures fifty and three hundred, respectively. If we assume a pump slip of approximately 40 per cent, the figure for total consumption would be cut to 200 gallons, and that for combined domestic consumption and leakage to 170 gallons.

In the same table we find another city reporting two hundred and sixty-six gallons as domestic consumption, and in this city also the water is pumped, and no allowance made for pump slip; and the total amount used for non-domestic consumption is given as twenty gallons per capita. Neither of the cities referred to gives any figures as to the minimum night rate.

Concerning leakage, together with other amounts unaccounted for, we may take from this table the twelve cities which meter more than 99 per cent of their services and which therefore are in a position to give fairly definite figures concerning this amount of unaccounted for water, and these show approximately 24 per cent unaccounted for in these cities. When we consider the fact that these cities are those having the largest percentage of meters and the most complete figures of the many reporting, it is natural to assume that they have also had the enterprise to take advantage of the knowledge so obtained and reduce this loss to a minimum; and it therefore seems probable that in other cities, where general indications are that not much attention is paid to the matter of consumption, the underground leakage would be considerably greater. Our own opinion is that from 25 per cent to 30 per cent of the water delivered to distribution systems is, in some cases, lost through these underground leaks. That these figures are not absurdly high is indicated by the amounts of such leakage actually discovered by pitometer and other leakage surveys made in different cities.

If we assume a 40 per cent pump slip which is not allowed for in the figures, and assume that, of the 60 per cent delivered, 30 per cent is lost by leakage, we have as the amount of actual consumption only 42 per cent of the figures given. Assuming 30 per cent leakage would reduce to 100 gallons per capita, instead of 300, the domestic consumption in the city above referred to.

The amount of water used by various industries such as railroads, factories, etc., and the commercial uses (those in stores, saloons, hotels, etc.) naturally vary much more widely than the domestic use, especially when it is divided by total population and given as use per capita; since not only the amount of water used in the industries varies enormously, but the number of such industries per capita would also be far from uniform in different cities. An examination of the accompanying table shows such variations to exist, but it also shows another rather surprising state of affairs. If we take again only those cities (of sizes varying from 400,000 to 3,000 population) that meter practically all of their services and are therefore able to give exact figures, we find that these use on the average only 39 per cent of the total consumption for domestic purposes and 37 per cent for industrial, commercial and public uses, with 24 per cent unaccounted for. In other words, nearly as much water is used in these cities, on the average, for non-domestic as for domestic purposes.

Since industrial and commercial uses vary only indirectly with the population, the general practice of stating in terms of total population the quantity of a consumption of which one half is more or less independent of the population, indicates that some change in method is

desirable if we are ever to have a scientific study of water supplies.

Even considering the water used for domestic purposes, there are excellent reasons for arguing that this consumption should be calculated and reported not as so much per capita of population, but rather as so much per user. Some time ago the University of Iowa collected figures of water consumption from thirty cities in that state, these containing, among other things, the percentage of population which was using the water. Only one city reported all the citizens using the public water supply, only four cities reported more than 85 per cent using it, and the average of all the cities was 65 per cent. The tendency of a greater number of citizens to use the public supply as a city increases in size is indicated by averaging the ten largest and the ten smallest of these thirty cities. In the ten largest it was estimated that 72.6 per cent of the population used the public supply, and in the ten smallest that 53.2 per cent were using it. In other words, in the larger cities nearly 40 per cent more citizens were using the public supply than in the smaller. This tendency goes a long way toward explaining the fact (which has been commented upon in a number of cases) that as a city grows, the per capita consumption increases. It is possible that the consumption by individual users does actually increase with the growth of the city, probably because of the introduction of a more generous supply of house plumbing; but even if this were not the case, this increase in the percentage of citizens using the water would explain such increase in per capita consumption when this is expressed in terms of the total population. Anything like a scientific study or fairly accurate statement of consumption should, therefore, take into consideration the number of consumers rather than use the total population as a basis of estimating consumption.

If pumps are actually, or even if they are only nominally by pump counters, pumping two hundred or more gallons per day per citizen, all figures available go to show that fully half of the coal used and fully half of the pump capacity is a waste pure and simple. If this amount is being driven through the mains, it also means either that unnecessary sums have been invested in unnecessarily large mains; or else that, if the mains are not correspondingly large, additional unnecessary coal is used in producing unnecessary pressure at the pump, or the pressure at the further ends of the distribution system is reduced below what is desirable, because of unnecessary friction loss due to the forcing of an unnecessary amount of water through the mains. A number of cases are on record where unnecessary leakage or waste of water has advanced by years the time when the limits of capacity of a given supply have been reached, necessitating the expenditure of hundreds of thousands of dollars for a new or increased supply which expenditure might have been delayed for one or more decades had the consumption been confined to that which was put to any useful purpose.

We can not help but believe from a consideration of the figures available, that millions of dollars are wasted in the country every year on account of the various causes which go to produce excessive consumption figures, whether these be waste, underground leakage from the distribution system, or slip in pumps; and that a proper regard for the rights of tax-payers and of those consumers who are not wasteful, as well as for the conservation of the water resources of the country (and this latter is becoming a serious matter in many of the more settled sections of the east), demands that this matter of water consumption be given more serious study by all waterworks men.

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Municipal Journal's Information Bureau, developed by twenty-one years' research and practical experience in its special field, is at the command of our subscribers at all times and without charge.

STREAM FLOW AND AVAILABLE SUPPLY.

To an engineer engaged in making plans involving a water supply drawn from a large lake or river, the quality of the water may present an important problem, but quantity requires no consideration. Where the supply is from a small stream, however, quantity becomes the chief problem, since there is no remedy for too small yield of the catchment area, but a remedy is available for most kinds and degrees of impurity.

Yield is a complex matter of days, months, years and decades. If the yield for a few days at a time at infrequent intervals falls below the demand for that period, a distributing reservoir or small storage reservoir will serve to equalize the supply. If the yield for months, or even for a dry year or two, will probably be insufficient, a much larger storage reservoir is needed. The problem in its extreme form may demand the retaining of as much as possible of the run-off of the catchment area, requiring a size of reservoir that may seem for a time extravagant. The Sweetwater reservoir, for example, at the end of two or three years (as we recall it) was only brought half full, subjecting the engineer to unfavorable criticism, but then one rain of most unusual intensity not only filled it, but sent a flood five feet deep over the crest of the entire length of the dam.

In other cases, catching the entire yield requires carrying a dam down fifty or a hundred feet through gravel to rock or hard pan, since a large part of the flow from the catchment area is underground, the stream flow becoming visible above the bed of the stream only when the underground flow exceeds its maximum capacity. Probably half of the flow from the catchment area of the Rock river of Wisconsin reaches a depth of three hundred feet or more, and could be secured only by wells, and then only partially.

Large reservoirs mean large amounts of evaporation and possibly of seepage, the evaporation in some sections

being many times the annual rainfall. And many other questions complicate the problem, which is seen to be not only meteorological, but geological and topographical as well. An apparently successful effort to solve the problem for a small village is described in this issue, a reservoir having been provided with a capacity of two year's consumption at the present rate (less evaporation and seepage), or six months' total consumption at the rate estimated for thirty years hence and with allowance for evaporation and seepage.

CITY PAVEMENTS AND HIGH COST OF LIVING.

Street paving as an element in the high cost of living has been given prominence by Secretary of Commerce Redfield in commenting upon a preliminary survey made by the Census Bureau at his direction. As the cost of the necessities of life is now of more widespread interest than any other subject, the matter of city pavements takes on additional interest for citizens generally. The Census Bureau does not directly refer to street paving; but it reports that it has learned that the cost of delivering them to the consumer constitutes 12 per cent of the cost of milk and dairy products, 19 per cent of the cost of coal and wood, and 45 per cent of the cost of ice. It is believed that the cost of delivering groceries is higher than that of delivering milk, and probably 15 per cent would not be far from the average cost for all food products, if the above figures are correct.

The most promising method of reducing this cost is by co-operation or monopoly in delivering, as suggested by us several weeks ago. But until such a system is adopted, anything that will reduce the cost and facilitate the operation of the existing delivery wagons should help to reduce the cost of living.

And smooth pavements (to reduce jarring and the resulting maintenance expenses of vehicles and breaking of articles carried), durable (to reduce interference with traffic by continual patching), and sufficiently wide on the thoroughfares to prevent congestion, should go far toward effecting reduction in delivery costs.

SOURCES OF REVENUE IN BALTIMORE.

The city of Baltimore, Maryland, finds that by taking advantage of all possible sources of revenue, it is able to add quite appreciably to the amount which it can obtain to meet municipal expenditures. Among the sources of revenue other than taxation may be mentioned sale of sludge from the sewage disposal plant, fees of the city surveyor's office, and franchise taxes on business corporations, each of which yields over \$5,000 a year; also revenue from free public baths, motor vehicle licenses, rentals, sales and fines collected by the Board of Park Commissioners, market rentals, electric conduit rentals, telephone conduit rentals, wharfage from public wharves and docks, dog licenses and fines, each of which yields \$10,000 a year or more; together with others which yield smaller amounts. The total amount of revenue obtained from these miscellaneous sources last year amounted to \$10,966,000.

APPEARANCE OF CITY STREETS.

Municipal Journal has taken occasion a number of times to call attention to the importance of the details entering into city street construction, not only from the point of view of utility, but also from that of appearance, and is glad to find its view on this point upheld by a practical engineer, S. E. Doane, chief engineer of the National Lamp Works, in an excellent paper read by him before a joint meeting of the Cleveland Engineering Society, and the Cleveland section of the American Institute of Electrical Engineers.

In this paper Mr. Doane has taken as his theme the assertion that any engineer or other city official who prepares a plan or signs an order for any job whatever located in or bordering on a street should ask himself this question: "Will the execution of this order mean a better looking locality?" and if it will not, he should endeavor to substitute some construction which will at least do as little esthetic damage to the locality as possible. "Let each one of us have on his mind this one thing, that whenever we execute a public job we will try to leave a better looking street when done than when we began."

It is, of course, natural that Mr. Doane should have specially in mind the treatment of lighting fixtures, but he did not confine himself to this, and also discussed the treatment of factory buildings, smoke stacks, water tanks, billboards, letter boxes, etc. In connection with letter boxes he makes the same suggestion that was made in *Municipal Journal* last year in the series of articles on practical street construction—that these boxes could be placed on buildings and even set into the walls of buildings, rather than on posts at the curb, thus removing one obstruction from the sidewalk.

Another interesting point to which he devoted considerable attention was that of removing from the streets the poles used for supporting trolley wires, lamps and other street appurtenances. Trolley wires, he stated, could to advantage be supported from the buildings facing the street rather than from poles erected therein, referring for proof of this statement to Lynn, Mass., where this has been done, as well as to some European cities. He also presented illustrations of methods of supporting street lamps from brackets, long or short, but always more or less ornamental, which are attached to buildings, or lamps suspended in the middle of the roadway from cables attached to the buildings rather than to heavy poles along the sidewalk. He also suggested the use of the roofs of buildings for supporting lighting, telegraph and telephone wires, etc., which also would help to eliminate poles from sidewalks. (Unless, however, some plan is employed by which workmen can reach these wire supports without annoyance to the occupants of buildings and the breaking and loosening of shingles, slates or other roof covering, and roof boards are not loosened by the supports, this method will not be popular.)

He calls attention to one aspect of the presence of poles and posts in the streets which has not often been referred to, namely, the danger such poles offer for accidents to those using the streets. According to figures to which he referred, the number of claims paid by the Travelers' Insurance Company in 1914 for accidents resulting from collisions with inanimate objects was more than twice as high as the number of claims paid to persons who were struck by trains and street cars. It seems that this argument for reducing the number of "inanimate objects" in our streets should appeal even to those who do not care what our streets look like.

Where poles are considered to be necessary, Mr. Doane expresses the hope that they at least will be straight and set perpendicular rather than at all sorts of angles. And here again safety enters in as well as appearance, since a leaning pole is much more likely to fall or be broken off by softening ground or the weight of ice-coated wires.

The title given to the paper referred to was "A Civic Duty for Engineers" and throughout the paper emphasis is placed upon the fact that the engineer should not wait to have an architect or member of some other professional enforce upon him a consideration for the appearance of the street or of the structures which he designs and which will be visible from the street, but

should himself realize that, as an agent in the construction of the modern city, it is his duty to know and act upon the knowledge that modern conditions and opinions demand a consideration of more than mere utility in the designing of such structures.

This paper has been reprinted from the *Journal of the Cleveland Engineering Society* by the National Lamp Works of Cleveland, O., from which copies can probably be obtained on request.

COLLOIDAL THEORY OF COLOR IN WATER.

As a result of investigation into the colloidal theory of color in water, Thorndyke Saville, Assistant in Municipal Administration in Harvard University, has reached certain conclusions which he stated in a paper last month before the New England Water Works Association, and which are, very briefly abstracted, as follows:

Color is largely due to colloidal particles, which are electrically charged. When color is removed by coagulants, this is due to the discharge of negative colloids by positively charged ions of the coagulant. The colloids, being similarly charged, repelled each other, but upon becoming neutral they collect in flocs and precipitate, the precipitation being assisted by mechanical action of the hydroxide floc. If the colloids were originally positively charged, only the mechanical action takes place and the color is only partially removed. Removal of color by storage in reservoirs is probably due to the contact between colloids carrying opposite charges, the contact being due to motion in the water from various causes.

Iron is probably the chief element in influencing the presence and removal of color in water; the iron existing in the form of extremely complex compounds in a colloidal state. Through many processes, the iron is changed from such compounds into the ferric state as a hydrosol and will then be precipitated by clay or any other positive colloid. Or the iron suspended is broken up into particles that carry opposite charges and so mutually precipitate each other.

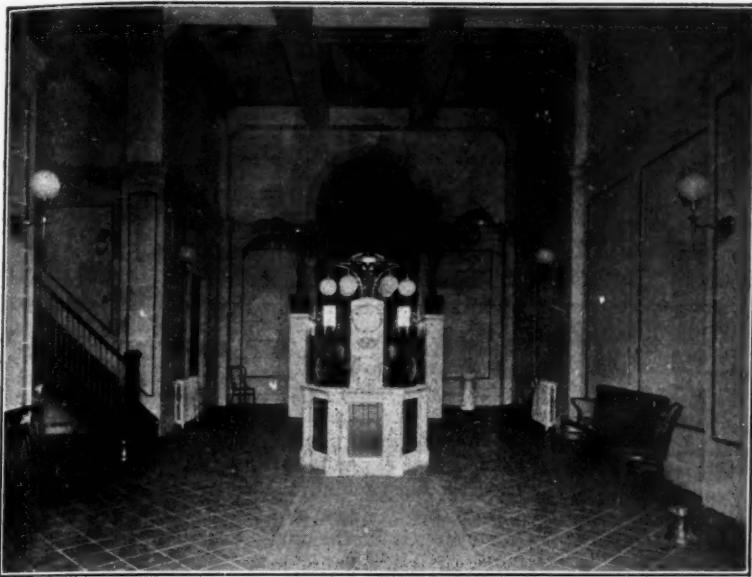
The removal of color is rendered more difficult by alkalinity, which increases negative charges and possibly makes for electrostatic stability in the iron suspensions, preventing flocculation and precipitation.

Probably color removal is not due wholly to colloidal properties of the coloring material, but the colloidal theory may be looked to for a more satisfactory solution of methods of removing color than now obtain.

ERIE WATER FILTRATION PLANT.

The water filtration plant of Erie, Pa., first went into service about the middle of the year 1914, the balance of that year being largely occupied in getting the plant properly regulated and learning its various idiosyncrasies; so that it has just completed its second year of regular operation. The plant consists of twelve rapid sand filter units, each having a capacity of two million gallons per twenty-four hours when operated at a rate of one hundred and twenty-five million gallons per acre per day. Water is taken from Lake Erie through an intake 17,641 feet long, which is believed to be the longest single piece of submerged 60-inch pipe in the world. When pumped from the lake, the water is discharged into a settling basin lined with concrete which holds approximately twenty-four million gallons of water.

The average daily pumping is about sixteen and one-half million gallons. In treating this water there is added about 0.2 of a grain of aluminum sulphate per gallon and three and one-half pounds of hypochlorite per million gallons. The per capita consumption is about one hundred and twenty-five gallons per day, about one-third of which passes through meters.



FILTER GALLERY LOBBY.

The turbidity of the raw water is never very high, seldom exceeding thirty parts per million, and that of the effluent has, in every case, been zero. B. Coli are found in about half of the samples of lake water analysed, but have not been found in any of the effluent samples. Bacteria generally are reduced from several hundred to an average of four or five per c. c.

One feature in which this plant differs most from the average plant is in the attempt to make it attractive and give the impression of purity by the cleanliness, neatness and even beauty of everything connected with the plant. The photograph of the filter gallery shown herewith illustrates this. The white enameled radiators, light-colored slate operating stands and coping to the railings around the filter beds, and the palms (even though these

last may have been only temporarily placed), all show an effort on the part of the commissioners and superintendent to attract visitors to the plant and to give them an impression as soon as they enter the filter gallery lobby (shown in the other photograph) that the aim of the plant and all work connected with it centers about the one idea of purity and cleanliness.

The cost of producing this effect is very little—practically nothing as compared to the total cost of constructing and maintaining the plant, consisting chiefly in the use of white enameled paint for that of other colors, in the use of white enameling, enameled bricks or light colored polished stone for other construction materials; and most of all in a little attention and extra care in seeing that all of these are kept clean and that cleanliness and neatness be insisted upon in all employees and in all parts of the plant. We believe that attention to this particular will be highly appreciated by citizens and will repay the superintendent and department in the increased respect and confidence which the citizens will feel for the plant.

CLEANING MAINS IN SALT LAKE CITY.

The superintendent of waterworks of Salt Lake City, in his report for 1916, stated that the department continued during the year what has now become an established practice, namely, the cleaning of pipe lines which have become corroded with scale. Most of the pipe cleaned last year had had their capacity reduced as much as 60 per cent by deposits. Itemized costs of the cleaning are not given, but he states that by this work the full carrying capacity of the lines has been restored at a cost which was less than 20 per cent of that of laying new mains.



FILTER GALLERY. ERIE RAPID SAND FILTRATION PLANT.

The WEEK'S NEWS

Spokane's Asphalt Plant—The Lincoln Highway Grows—New Jersey's Sewerage and Water Supply Problems—San Francisco Without Meter Rates—Niagara Power Diversion Increased—Munitions Explosions Scare New Jersey—Upheaval in Chicago's Police Department—New York Police "Rookies" in Diet Squad—Fires in Valdez, Alaska, Troy, N. Y., Frankfort, Ky., and Palo Alto, Pa.—Oklahoma Cities Unite for Progressive Legislation—Possible Public Ownership of Boston's Elevated—Business Section Traffic Congestion in Trenton—Lewiston's Municipal Coal Yard.

ROADS AND PAVEMENTS

City Asphalt Plant Makes Saving.

Spokane, Wash.—Although the cost of material increased 20 per cent over 1915, each yard of asphalt laid in Spokane during 1916 cost the city about 40 cents less than that laid the year before, according to the yearly report of the asphalt plant just published. During 1915, 5724 yards of asphalt were laid in the city at a cost of \$6,931.51. The average cost for each yard was \$1.21. Last year 9,834 yards were laid at a total cost of \$8,057.30. The average cost was about 82 cents. General maintenance of curbs and cross walks cost \$926.25 during 1916, compared with \$2,084.75 the preceding year. The works department also laid 988 yards of brick pavement at a cost of \$725.85. In 1915, 85 yards were laid at a cost of \$231.40. The department during the year performed \$35,145.38 worth of work for private parties, compared with the 1915 figure of \$7,415.04. Uncompleted work now amounts to \$4,165. Paving material on hand at present is valued at \$5,716, compared with \$1,792 at the beginning of 1916. In addition to the work in the city streets the asphalt plant has been rebuilt with concrete and steel construction, a new boiler has been installed and the plant modernized with extra machinery.

Celebrate Opening of New Bridge.

Lawrence, Kans.—About 4,000 people attended the celebration which marked the opening of the new \$200,000 bridge across the Kaw. The money had been voted in July, 1913, by a majority of 719, 2,404 to 1,685. In March, 1915, the board of county commissioners appointed Hedrick and Cochrane, of Kansas City, Mo., as consulting engineers. The Missouri Valley Bridge and Iron Company constructed the bridge on a bid of \$199,910.

Progress of Lincoln Highway.

Detroit, Mich.—According to A. F. Bement, secretary of the Lincoln Highway Association, wonderful progress was made during 1916 on the transcontinental road. "Three years ago," says Mr. Bement, "it was but a vision in the minds of a few constructive dreamers. Their vision has been verified, and its story is an epoch in road building. It is the first through connecting road upon which it has been possible to concentrate public attention and interest to such an extent that in three years the combined forces of the states, counties, townships and municipalities through which it passes has resulted in the expenditure of more than \$11,000,000 in constructive work. A phase of improvement worthy of note is the standardized marking of the highway. This work was completed this year from New York City as far West as North Platte, Nebraska, a distance of more than 1,700 miles, involving the erection of more than 8,000 markers. These markers are as well defined in the big cities as in the rural districts. Huge sums of money have been spent in real road improvement. In New Jersey, where the Lincoln Highway is entirely hard surfaced, \$183,678 was spent in repairs and maintenance. Pennsylvania maintains her section of the highway with greater care and at more expense than any other State, expending \$193,000 in 1916 for the purpose. During the year contracts were let in Ohio for permanent road building on the highway for \$775,000, exclusive of the paving of many city streets on the route. Work on the roadway in Indiana cost a sum in excess of \$700,000. This is particularly notable, as road construction there is entirely up to the counties, there being no state highway department. Illinois expended \$335,-

000. In Iowa, owing to the fact that counties are not permitted to bond for road construction, the work has been confined to grading, draining and maintaining existing roads, there being no hard surface improvement outside of the municipalities. Reports from Nebraska indicate that more than \$367,300 was expended, notwithstanding the fact that the counties through which the route passes are large and sparsely populated. The condition of the Lincoln Highway in Wyoming is in the main excellent, the amount spent being more than \$10 per capita. The Lincoln Highway in Utah, particularly that section next to the Nevada line, is the worst section to be encountered between the two coasts. The cost of its improvement is away beyond the reach of the people of the state. This section, if improved at all, must be taken care of from outside sources, and every effort has been used by the association during the past two years toward securing sufficient co-operation to make possible the opening of a permanent connecting link across the desert. There is another bad spot in Nevada, where the highway traverses what was once the bottom of a prehistoric lake. The association interested the officers and directors of the Willys-Overland Company in this situation, with the result that an offer was made by them of \$50,000 for construction in this section, this amount to be equaled by a fund raised within the state. California is also helping out and is endeavoring to raise another \$50,000 for use in Nevada. California's share of the highway is nearly all hard surfaced and a part of the state highway system. Those sections not yet permanently constructed will be taken care of with the money provided through the recent authorization of a \$15,000,000 bond issue."

Regulating Street Openings.

Berkeley, Cal.—The city council has passed an ordinance regulating the use of public streets and thoroughfares for the purpose of laying down pipes and conduits therein and making connections. This ordinance empowers the city to replace all excavations made by public service companies in the streets, charging the cost of such work to the public service corporation. Contractors and others who may need to open streets for the purpose of laying sewers, water mains, gas and electric connections, will be required to make a general deposit of \$500 with the city, which amount will be held to cover any expenses incurred by the city in repaving the streets after filling in excavations. The ordinance provides for an inspector to see that the work of laying sewers, etc., is efficiently done. Immediately the contractor has finished his particular work, the city will take charge of the filling in and repaving. The city will employ a special squad of men for this work and the street will be thoroughly tamped before being resurfaced.

An Almost Perfectly Paved Borough.

New York, N. Y.—According to an announcement by borough president Lewis H. Pounds, of Brooklyn, 85.58 per cent of the paved blocks of his borough are "without defect." A district inspection of all the pavements in the borough has been completed under the supervision of Herman H. Schmidt, chief engineer of the Bureau of Highways. It is stated that of the 8,882 paved blocks in Brooklyn, 7,601 are "absolutely without defect of any kind." "The defects which we have considered," said Engineer Schmidt in his report, "are what may be known merely as maintenance defects, and by that I mean openings in the pavement, wear and tear, fire burns, excessive service, etc.,

which would, in the ordinary course of events, be taken care of by our maintenance division. This does not mean that all the blocks are in perfect condition as far as the character of pavement is concerned. In other words, if a cobblestone or Belgian block street is entirely free from openings and holes, we would count it as repaved with more modern pavement." Referring to the reasons for many of the defects in the 15 per cent of blocks classed as "defective," Mr. Schmidt said: "It can be readily seen that where we are issuing permits to open streets in such large numbers as we do, we may, in a few days, issue enough permits to affect 248 blocks, so that the question of having a few more or a few less blocks in good condition than at present would depend, not upon more effective work being done by the repair division, but almost entirely upon the number of permits issued for the opening of pavements." Borough President Pounds pointed out that there are about 30,000 openings made in the streets each year. He said that the streets of the borough had been practically rebuilt since 1910. Since that time about sixty miles of streets have been rebuilt every year, up to 1916, when, due to the inability of contractors to obtain material and labor, only thirty miles of streets were actually repaved last year.

SEWERAGE AND SANITATION

A Sanitary and Health Survey.

Spokane, Wash.—A sanitary and health survey of the city has been launched by the health department as the big project of the health force during 1917. Results will be shown on a huge map of the city hung in the health office. Colored pins will show at a glance the condition of every district in town with regard to sanitary conditions and the amount of contagious disease. Every dairy in the city will be marked, indicating the number of cows milked, and the condition of the plant will be shown by the color of the pin. In addition to the contagion markings, each block will be marked with reference to its sewered condition. This, Dr. Anderson says, will help demonstrate graphically in what districts disease is more prevalent. The survey itself will be made by the entire health force in connection with its regular duties. Each employee has been instructed to make notes on the conditions found in the districts covered by him and dairy tabulations will be made.

Cannot Trace Typhoid Epidemic.

South Bend, Ind.—South Bend is now in the grip of typhoid fever and unless preventive measures are taken at once the epidemic may prove one of the worst in the history of the city. There are now 28 cases in South Bend. City health officer C. S. Bosenbury is at a loss to know just what is causing the sickness. The water from which the sick persons drank has been tested and found with the exception of one case, to be in good condition. The spread of the disease can hardly be laid to milk, as practically a different dealer in town delivers to each of the houses where persons are sick with typhoid. Recent milk tests made by the department have shown no traces of possible contamination. According to reports of the health department, the majority of the cases are in the southeastern portion of the city. It was in this section that the water from a private well was found to be contaminated.

Sewerage and Water Supply Problems of New Jersey.

Trenton, N. J.—A joint conference called by the State Department of Health to consider the general policy of the state with reference to the conservation of water supplies and provision for sewage disposal, adopted a resolution offered by Clyde Potts appointing a committee from the three departments represented at the conference to consider and report upon the following points: 1. To define the watersheds that are now used for the collection of water for potable purposes, with the points of intake of said supplies. 2. To define the watersheds that may be conserved for the collection of water for potable purposes, with the probable points of intake of the proposed supplies. 3. To outline methods that may be adopted to secure for the people of the state using, or who may use, such supplies, sanitary protection in the enjoyment of the same. 4. The committee

shall prepare a report in writing covering the points above mentioned and furnish a copy to each of the three departments participating in the present conference. The committee designated by the resolution consists of the following officers of the three departments represented at the conference: The director, or officer appointed by him, an engineer of the Department of Conservation and Development; the director or assistant director and the chief of the bureau of engineering of the department of health, and the engineer of the North Jersey District Water Supply Commission. While the resolution was under consideration, engineer Morris R. Sherrerd of the North Jersey commission pointed out the seriousness of the water problem which is likely to confront New Jersey in years to come. It was Mr. Sherrerd's views that the State Board of Health should conserve every stream in the state without limiting its functions to such as may be used for potable purposes. Recalling that in 1892 Newark was using from 18,000,000 to 22,000,000 gallons of water daily, Mr. Sherrerd said it is now using 47,000,000 gallons. Assuming that the average community doubles the amount of water consumed about every twenty-five years, Mr. Sherrerd said it was difficult to see where first-class communities would obtain the supplies needed a hundred years hence. The Wanaque, according to Mr. Sherrerd, will probably furnish sufficient water for Newark and other municipalities obtaining water therefrom for the next twenty years. After that, he suggested, it might be necessary to go to the Delaware River for water. As an argument in favor of the conservation of all streams, Mr. Sherrerd remarked that Newark was compelled to abandon its former use of the Passaic River because of the pollution of that stream.

WATER SUPPLY

Suspend Meter Rates in San Francisco.

San Francisco, Cal.—The Railroad Commission of California, following an indignant opposition against the Spring Valley Water Company's alleged high meter rates, has repeated a decision that no meter rates may be charged until February 1st, or the further order of the commission. Consumers must be billed under the old flat rates, but meters must be read monthly and the charge under meter rates indicated on the bill. Such meter rates as have already been collected must be adjusted on the basis of the flat rates heretofore in effect. The decision re-affirms the order given last November against which the Spring Valley Company protested. In its decision, the commission says: "The rates of Spring Valley Water Company now in effect were established by the Board of Supervisors on June 29th, 1915. None of these rates were established by the railroad commission and the commission has not had any opportunity to pass on any of them, nor has the commission approved any of said rates. Prior to the middle of 1916, Spring Valley Water Company had metered a large number of its business customers and some 800 to 900 residence customers, whose services were metered under special provisions of said ordinance, and similar earlier ordinances. Beginning with July 31, 1916, however, Spring Valley Water Company metered a large number of its residence customers, until on December 15th, 1916, 14,836 additional meters had been installed on residence services. Spring Valley Water Company is still engaged in installing additional meters on its residence services. The company contemplates the installation of approximately 25,000 meters on residence services subsequent to July 31st, 1916. The record herein shows agreement by practically all interests that, with certain possible exceptions, Spring Valley Water Company's water system should be metered in its entirety. The principal water companies in the United States, whether owned by private individuals or by municipalities or other public authorities, have, with few exceptions, metered all or the major portion of their systems. Metering conserves water and hence is in the public interest, particularly when the supply is not abundant. Furthermore, metering is fair as between consumer and consumer because it enables each consumer to pay for what he gets and prevents the careless or waste-

ful consumer from penalizing the consumer who is careful in the use of water. The railroad commission believes that the Spring Valley Water Company's system should, with certain possible exceptions, be metered in toto. This position, however, is subject to three distinct conditions:

(1) The meter rates must be just; (2) The minimum charge for metered service must be reasonable; and (3) The measuring devices must be reliable. The installation by Spring Valley Water Company of meters on residence services on and after July 31st, 1916, resulted in many difficulties with reference to the charges to be collected from the consumers whose services were thus being metered. These difficulties resulted partly from excessive or wasteful use of water, due to carelessness, leaky fixtures and other causes, partly from the fact that landlords and others had not made their arrangements in contemplation of metered services, partly from the form of the rates established by said ordinance. Under this ordinance the only lawful meter rates for water in effect in the city and county of San Francisco are for (1) places of business, (2) pipes used specially for fire protection, (3) water furnished for any and all purposes not embraced in the first nine sections of the ordinance, including water for shipping, and (4) wasteful and excessive use. Hence, apart from the question of wasteful or excessive use, it conclusively appears that under the rates prescribed by this ordinance Spring Valley Water Company does not at this time have any lawful right to make any meter charges whatsoever for water supplied to dwelling houses. Section 12 provides that meters may be installed 'for the purpose of discovering and repressing waste or excessive use' and that 'for waste or excessive use thereafter occurring' in excess of such an amount of water as shall exceed by 50 per cent the number of cubic feet which at regular meter rates amount to the consumer's rated bill, the water company may charge 'at regular meter rates.' The section contains a proviso that the charge for wasteful or excessive use shall not exceed \$2 for the first month, \$4 for the second month and \$5 for any following month."

Profitable Waterworks.

Lorain, O.—The Lorain water works, a municipal utility, last year made a profit of \$24,643.48, according to the annual report just issued. The profit does not include \$5,292.71 put back into the plant in maintenance expenditures. It would have made more but for the failure of the boiler system, requiring the plant to purchase steam from a power company for \$7,000. Half of this will be saved this year because of the installation of new boilers.

Dead Cats in Reservoir Scare Citizens.

Fort Wayne, Ind.—Following a number of cases of sickness which indicated a possibility of water pollution, five samples of the water from different parts of the city were taken by J. C. Diggs, state water chemist and sanitary engineer. Diggs had received a specimen of the water at Indianapolis and found it so bad that he went to Fort Wayne immediately for further tests. The board of health had some time before warned citizens to boil all water and then shut off the supply in the city schools. While state chemist Diggs was making his examination the fears of the citizens were greatly increased by the discovery of dead cats in the reservoir. The basin was cleaned out, the big pumper from engine house No. 1 being used. The report of state chemist Diggs was then received by Dr. H. O. Bruggeman, president of the board of health, who said, "The samples from the three pumping stations are negative, while a sample taken from a faucet some distance from any pumping station is infected with sewage organisms. In other words, the source is pure, but the mains are impure. Then there is another phase. The pollution seems to be intermittent. Some times the water is pure and sometimes filled with dangerous organisms. It would seem from these facts that through some dual connection between the city water and some private plant river water is being forced into the city mains, for the tests disclose that the polluted water is exactly the same as river water. This would account for the intermittent phase too, as it is possible that the private stations maintain a varying pressure that one

day forces impure water into the mains and another day does not. But it doesn't explain how the same pollution is found in a private well ninety feet deep four blocks from where the infected city water was found. There are a number of dual connections in Fort Wayne of which there is no record, and it may be found by careful examination that may cost lots of money that one of these is responsible."

STREET LIGHTING AND POWER

Permit for Increased Niagara Development.

Niagara Falls, N. Y.—By a vote of 247 to 82 the House of Representatives passed a bill permitting the diversion of 20,000 cubic feet of water per second from the Niagara river above Niagara Falls for power purposes. This is the full diversion limit allowed on the American side by the treaty with Great Britain. The bill has already passed the Senate. When the President signs the measure the power famine on the American side, resulting from the cutting down of the amount of power imported from Canada, will be relieved. An amendment proposed by Representative Mann, and adopted by the house, imposes an annual tax of \$100 for each cubic foot of the 20,000 allotted American users. The full amount of water permitted to be diverted under the international treaty will be available until March 4th. The present bill passed was an emergency measure. It is thought that before it expires permanent Niagara legislation will have been enacted. Prominent Niagara Falls manufacturers came to Washington to urge the passage of the power measure.

To Construct Municipal Light Plant.

Lubbock, Tex.—The city council has voted to erect a municipal electric light plant, to be operated in connection with its present water works and sewage disposal plant. Estimates and bids already had been submitted and contracts have been signed. Construction will start at once. It is expected that the plant will be completed and in operation by July, 1917. The plant will cost between \$30,000 and \$40,000. Electricity will be sold at 10c. per kilowatt at the beginning, but it is expected that the rate will be gradually reduced. The plant is expected to pay for itself in 28 months. Electricity is now supplied by a private plant at 17c. a kilowatt.

Diesel Engine for New Plant.

Chatham, N. B.—Consul E. Verne Richardson reports from Moncton, New Brunswick, that the town of Chatham, one of the busiest of the lumber shipping points in the Province, is installing a 200-horsepower semi-Diesel oil-burning engine to provide power for the new municipal electric lighting station. The plant was built to replace one destroyed by fire earlier in the year. Light from the new system is expected to be available by the end of the year.

FIRE AND POLICE

Two Munitions Explosions Shake Five States.

Kingsland, N. J.—Fire in the ammunition plant of the Canadian Car and Foundry Company, near here, destroyed the factory and shops and houses within several hundred yards, with a loss officially estimated at \$17,000,000, forced the evacuation of a large part of the town of Kingsland, making 1,000 people homeless for a time, and furnished a spectacle more magnificent than the munitions fire on Black Tom Island last September. For four hours Northern New Jersey, New York city, Westchester and the western end of Long Island listened to a bombardment that approximated the sound of a great battle—a bombardment in which probably half a million three-inch high explosive shells were discharged. Not a single life was lost. Thirty-eight one and two-story frame buildings, covered with corrugated iron, on the meadows, where three shifts of 1,400 each, mostly negroes, were employed in filling the explosives into the shell cases, were the scene of the fire. The fire spread to eleven cars full of loaded shells on the Lackawanna tracks, and then began the bombardment. The

workmen fled in all directions and the scare spread to the citizens of the surrounding towns. Mayor Albert A. Clay and Chief of Police McIntyre of Kingsland called out all the police reserves of Kingsland, Lyndhurst and Rutherford, and Sheriff Courter, summoned by telephone from Hackensack, swore in every able-bodied man he met as a special deputy sheriff to preserve order. As an instance of the constant danger in which the police performed their work may be cited the experience of Chief McIntyre and Chief Bernham of Rutherford, who were driving in an automobile along one of the streets in Guinea Hill when a three-inch shell dropped from the skies right into their car, wrecking it, but the men were uninjured.

Many regulations for the storage, handling and shipment of explosives had been enacted by the federal authorities and by many states, particularly those of the east, before the Black Tom explosion last fall focused attention on the danger from the presence in or near centers of population of large quantities of death-dealing material. The Canadian Car and Foundry Company was one of the opponents to efforts of Jersey City and nearby communities to enact and enforce laws to protect their communities from the danger of the presence or passage of high explosives. The Jersey City aldermen adopted, on August 1st, resolutions designed to stop the shipment of explosives or the storage of them within the city limits. The Central Railroad of New Jersey sent out warning that the city authorities would be held responsible for delaying such shipments, and in some towns private detectives were sent to guard loaded cars, but Perth Amboy and Roosevelt, N. J., both joined the fight within the next few days by enacting similar ordinances. The commissioners announced their determination to enforce their embargo and called upon the federal authorities to arrange for water movement of all such cargoes. The company obtained its injunction within a week, and the shipment of munitions through Jersey City was resumed, but the city authorities still were determined to hold up the product of other companies and to enforce their regulations against storage of explosives. There followed the arrest by the Jersey City police of men handling munitions, in test cases designed to determine their right to do so. Fears of Jersey commuters were somewhat allayed after that, when the railroads announced that they were using extreme care in the transfer of explosives. A few weeks later the fight practically subsided, when Jersey City contented itself with passing an ordinance that all cars loaded with munitions must be plainly marked and that they could be moved only in daylight.

Haskell, N. J.—Within twenty-nine hours of the Kingsland disaster the metropolitan district and nearby states were again rocked by a munitions explosion. Four hundred thousand pounds of smokeless powder exploded at the duPont powder works, which are thirty-one miles northwest of New York City. Damage estimated at \$350,000 was caused by the series of blasts. Two were killed and nine injured. The force of the explosion—or series of explosions—was felt for a radius of 150 miles, and with the exception of the Black Tom disaster they were the most violent of the munitions explosions in the vicinity of New York. Houses were shaken in Manhattan, Brooklyn, and the Bronx, windows were broken in many places in Westchester county, in Staten Island, and the shocks were felt as far away as Albany and parts of Massachusetts. The first explosion was in what is known as "the glazing barrel." The fire which resulted spread quickly to the blending house, and from there to three magazines. One of the magazines blew up, but the powder in the others was consumed by the flames. The blazing magazines set fire to the screening house, from which the flames leaped across the Wanaque river and consumed three drying houses on the other side. At this point the fire was checked by the efforts of the company's employees. Other buildings in the plant, and many in the village, which was built in a semicircle around the works, were shattered by the force of the concussion. At Pompton Lakes, near Haskell, every house was damaged. A knitting mill a mile

north of the duPont plant was wrecked. It was 9:22 o'clock that the blaze started in the glazing house, almost in the center of the long line of 500 buildings that stretch away from Haskell up the Ramapo hills, and form the smokeless powder plant, said to be the greatest in the world. At midnight the fire was still burning, but it was under control at 2 o'clock the next morning.

Chief of Police Arrested.

Chicago, Ill.—A storm of scandal has again broken out in Chicago's political and police circles, the aggressive State's Attorney Maclay Hoyne having caused the arrest of Chief of Police C. C. Healey and high police officials on warrants charging conspiracy and corruption. The usual connections between the "higher ups" in the police force and the underworld, and the network of bribery for police protection have been exposed and some of those charged have confessed. Mayor Thompson is directly attacked in a number of questions by Prosecutor Hoyne—in fact, the whole situation is a new phase in the war between the Mayor and the State's Attorney. A few weeks before Chief Healey had resigned, by request, but had remained over to handle the policing of New Year's eve celebrations. Mayor Thompson has appointed Herman F. Schuettler, first deputy superintendent of police, as chief. Schuettler has been in the department for thirty-four years and has been acting chief a number of times.

Alaska Town Destroyed.

Valdez, Alaska.—For the second time in eighteen months Valdez lies in ashes. Fire, aided by a stiff wind from Prince William sound, wiped out the business section and invaded the residence district before it was subdued. The cause of the fire is attributed to incendiarism, as the flames started in four places about the same time. The loss is estimated at \$300,000, covered partly by insurance. This makes a fire loss for Valdez of more than \$800,000 since July 15th, 1915, the date of the first fire. Property in five blocks was destroyed. Seventeen buildings and their contents were entirely burned, and many other structures suffered through smoke and water.

Efficiency Methods of the Police Department.

San Jose, Cal.—The latest of a series of new departures for improving the police department will be a systematic registration of every crime and every lost and stolen article in order to provide statistics showing the state of efficiency of the department. Paul Eliel, assistant city manager, and J. N. Black, acting chief, have been busy for some weeks past devising comprehensive schemes for improving the efficiency of the department, finding the time of day when the largest proportion of crimes is committed in order to improve the distribution of the officers, the ratio of convictions to the amount of the sentence, the installations of the Bertillon and Henry systems of identification and so forth. The latest plan is expected to provide a reliable means of testing the efficiency of the department, as each arrest or recovery of property will be credited to the department, and an annual and monthly examination of the indexed records will be carried out by the city manager.

Policemen in Cost of Living Experiment.

New York, N. Y.—With the aid of the Life Extension Institute and twelve volunteers from among the "rookies" in the police department school, Police Commissioner Woods proposes to show that 25 cents is ample for the support of one person for one day. Under the direction of the institute the twelve volunteers will be fed, weighed and measured three times daily. Exactly 25 cents will be spent on the meals of each man per day, and each will be placed on his honor not to fortify himself with additional nourishment of any kind elsewhere. The experiment will cover a period of three weeks. During the whole period the "rookies" will continue their strenuous program of physical and mental exercises at the police training school. The experiment will be directly in charge of Prof. Henry C. Sherman of Columbia University. He will be assisted by Prof. Irving Fisher of Yale and Dr. Eugene Lyman Fisk, medical director of

the Life Extension Institute. Prof. Mary S. Rose of Teachers' College will have supervision over the preparation of the food. In explaining the purpose of the experiment Commissioner Woods said: "By means of the experiment we hope to give the housewives of the city the message of today in economic and healthful food values. We hope this will prove one of the practical ways to cut the high cost of living. In the course of the experiment it will be shown that cheaper foods can be prepared in a palatable and acceptable way and that waste may be eliminated. The menus will be of a character that the average family can follow. They will in no way represent a rigid minimum emergency diet, but on every day diet that every individual, rich or poor, could utilize with benefit."

Chief Hurt in Big Blaze.

Troy, N. Y.—Some thirty persons were injured, and damage estimated at between \$60,000 and \$100,000 was done by fire which totally destroyed the Odd Fellows' temple and gutted an adjoining newspaper building. Every piece of fire fighting apparatus in Troy was called to combat the blaze, which proved one of the most disastrous Troy has ever had. A back draft which blew out nearby plate glass windows and shot flames across the street, was responsible for the injuries sustained by several policemen and firemen, including fire chief Patrick Byron, said to be the oldest acting fire chief in the United States. Persons standing in the middle of the street were hurled to the opposite curb when the explosion came.

Many Threatened in Spectacular Prison Fire.

Frankfort, Ky.—Three dead and forty-five injured, overcome with heat or prostrated by the shock were the toll of a fire which gutted cell house A, the colored section of the state reformatory, in a night fire. The men were rescued from the cell house after they had spent over an hour in the roasting heat and deadly smoke, locked in their cells, with the flames licking down at them and creeping toward them in plain sight, the horror of their position accentuated by crashing timbers from the roof and walls around the cells, which are piled tier on tier, four high around the center of the long, narrow building. They were gotten out at the risk of the lives of fellow prisoners and guards, who were compelled to dig a hole through the wall at the rear of the annex, extending out from the cell house, and use ladders and ropes to reach the imprisoned men and let them down, after climbing along planks pushed before them on the girders. Many prisoners were taken out unconscious. The only entrance to cell house B, where white prisoners are kept, is through the burned cell house, and the white prisoners were taken out through a window, the bars of which were pried apart. When the lever was thrown, releasing the cell doors, the men in their hurry to get out jammed the keys in the doors and delayed their rescue. There were about 800 men in cell A, which was a building 120 years old. Not one prisoner attempted to escape in the excitement. The whole city department was at work on the blazing prison.

Fire Destroys Power Plant Building.

Palo Alto, Pa.—One of the worst fires in the history of this section destroyed the car barn and a large part of the power plant of the Eastern Pennsylvania Railways, Light, Heat & Power Company at Palo Alto, just along the border line of Pottsville, putting about a dozen towns and many small villages in darkness, tying up trolley traffic for two days, and causing a loss of about \$200,000. The cause is unknown. The announcement is made that the plant will be built to an even larger scale than before and the work at rehabilitating the power department was under way while the fire was still burning. The loss consists of the car barn building, the trolley power converting building, tens of thousands of dollars worth of electrical supplies of all kinds, and rolling stock, comprising 21 cars and machinery—some just received and not yet installed. The fire was in the storehouse under the car barn and was seemingly of little importance, but in a few minutes it swept through the big room and broke through to the floor above. The oil soaked flooring was rapid fuel for the blaze. Even the cars closest to the exits could not be

saved, both on account of the smoke and flame, and because of the short circuiting of the electric wires, which cut off all power. Pottsville was asked for help and the entire city equipment got ready to respond and several of the companies with complete apparatus arrived quickly. The Palo Alto, Port Carbon and St. Clair departments were also in service. Trolley cars were stalled dead along the various divisions, soon after the blaze started, when the lines were short circuited. There was the greatest excitement and consternation everywhere. Pottsville, Minersville, Pt. Carbon, Orwigsburg, Pinegrove, Tremont, Palo Alto, and all towns in contiguous territory with the exception of Schuylkill Haven and St. Clair, which have their own municipal electric light plants, were left without light.

GOVERNMENT AND FINANCE

City Employees Must Be Citizens of State.

New York, N. Y.—In a decision handed down by the Appellate division of the Supreme Court affirming the ruling of Justice Kelly, who directed the city officials to dismiss Miss Eugenia S. Prengel, a supervising nurse in the health department, on the ground that she was an alien, the higher tribunal holds that city employees must be residents of the state and citizens. The decision, if upheld by the Court of Appeals, will affect hundreds of persons employed in the municipal government who are now residents outside the state. It will stop the appointment or employment of persons in the city departments who live in New Jersey or Connecticut. The decision says: "The legislature has, in distributing powers, enabled the board of aldermen to determine its officers and employees shall not be aliens and non-residents, with foreign allegiance, alliance and interests, but members of the state and dwellers in it." Miss Prengel, while an alien, entered the department of health as a nurse. She later became supervising nurse in the Brooklyn bureau of the department. Although she lived in the city for many years, she never became a citizen, but remained a subject of Germany. A taxpayer's suit was brought to oust her, directed against Controller Pendergast, Health Commissioner Emerson, Dr. Henry Moscovitz, Darwin R. James, and Alexander Keogh, of the Civil Service Commission.

Must Stay Within Tax Limit.

Columbus, O.—The Supreme Court reiterated its ruling that county commissioners cannot go outside the Smith one per cent tax law limits to raise funds for ordinary road repair. The court upset the judgment of Miami county appellate court, which held that county commissioners could declare needed road work an "emergency" under the Smith law. The roads had not been damaged by floods or other unexpected cause. The Supreme Court gave a similar decision in a recent case reported from Cuyahoga county.

League of Cities Asks Legislation.

Oklahoma City, Okla.—Final drafts of bills that the League of Municipalities of Oklahoma will seek to have enacted by the sixth legislature are being made by the executive committee of the league, composed of P. P. Duffy, mayor of El Reno; Prof. F. F. Blachley of the State University and other officials in Oklahoma. The list of acts that are to be asked is long. It includes measures limiting the power of excise boards in taxing matters for municipalities looking to greater home rule for such; regulation of assessment of poll tax in cities, apportioning road and bridge taxes with better regard for the interests of the cities, distributing the support for indigent persons more liberally toward the cities, empowering larger taxing power for cities with reference to the public health and generally revising the laws to the best interest of the municipalities without disregarding the rights of rural communities. The home rule provision as to levying, collecting and expanding taxes is the main item in the reform program of the league. It was the subject of considerable discussion in the recent annual meeting of the league in this city.

TRAFFIC AND TRANSPORTATION

Relief for Boston Elevated.

Boston, Mass.—Three measures of relief for the Boston Elevated Railway Company were agreed upon by the special commission which has been considering the financial needs of the company, which had complained of financial stringency. It was voted that the \$500,000 deposited with the state twenty years ago to guarantee the property damages accruing from the construction of the Elevated structures should now be returned to the company. The commission agrees with the company's contentions that the necessity for this deposit has passed. The commission also voted in favor of relieving the company of the Cambridge subway, by approving the general principle of public ownership, leaving the Legislature to say whether it shall be the state or the municipality that shall take over the tube. Enclosed transfer points are also favored by the commissioners, with no specifications as to their locations. That is left to the discretion of the company, subject to supervision and authorization of either the Public Service Commission or the Boston Transit Commission, as the Legislature may determine.

Court Says City Cannot Regulate Motor Speed.

Helena, Mont.—Chapter 73, laws of 1913, took away from municipalities of Montana the right to regulate the speed of motor traffic is the effect of a ruling of judge J. M. Clements in the district court sustaining a demurrer interposed by C. S. Wagner, assistant attorney-general, to the complaint brought against him by the city of Helena, charging him with violating the speed ordinance. Wagner was found guilty in police court and he appealed. It is expected the city will carry the case to the supreme court to secure a final ruling.

Canadian Towns Favor Hydro-Radials.

Bridgebury, Ont.—The lake shore municipalities, Bridgebury, Fort Erie and Port Colborne gave enthusiastic majorities in favor of the hydro-electric railway projects. These towns voted for more than \$2,000,000 in bond issues to pay the cost of the roads. The surveying and preliminary work of the railway construction will be done before the war is over. The actual construction will not be started until after the war, making work for returned soldiers. The success of the election is largely attributed to the eloquence of Sir Adam Beck of the Hydro-electric commission. The votes were: Bridgebury, 178 against 7; Fort Erie, 78 against 8, and Port Colborne, 216 against 3.

MISCELLANEOUS

Elimination of Business District Congestion.

Trenton, N. J.—For a number of years city administrations have been confronted with the difficult problems of congestion in the central business district and simple solution seems impossible. City commissioner George B. La Barre, director of public safety, has made a detailed and exhaustive study of all past and present plans for a solution of this traffic congestion problem. He now presents a plan for a great city square. Commissioner La Barre's plan provides that the city purchase or otherwise acquire all of the properties included in the area within the north line of East Hanover street, an imaginary line extended from the present north line of West Hanover street through to Broad street, the east side of Warren street, and the west side of Broad street. This area is indicated on the drawing of commissioner La Barre's plan made by city engineer Abram Swan. This square would approximately have 195 feet frontage on North Warren and North Broad streets, and 330 feet frontage on East Hanover street and the suggestion continuation of West Hanover street. It is estimated by commissioner La Barre that this improvement, which would apparently solve all traffic problems in the centre of Trenton, would cost about \$800,000. In the area embraced in the plan there are ratables valued at about \$500,000, and this valuation would be wiped out with the de-

struction of the buildings in the area. But this loss of ratables, it is estimated, would be quickly compensated for by increased ratables arising from the proposed improvement. Commissioner La Barre's plans for financing the improvement include a bond issue of \$600,000 and the spreading of the remaining \$200,000 of the estimated cost of the improvement over the general tax levy of the city, with a proper proportion assessed against the trolley companies that would benefit by the improvement. These companies would pay their share in annual rentals. The great public square that would be created by the La Barre plan would be an area of civic utility. It would provide a turning place for suburban trolley cars, which now use greatly congested streets for turning cars and for receiving and discharging passengers. It would permit of the erection of two public comfort stations. It would give a trolley waiting room 80 feet square. It would allow the



PLAN FOR ELIMINATING TRAFFIC CONGESTION IN CENTRAL BUSINESS DISTRICT OF TRENTON, N. J.

construction of a trolley station platform 20 feet wide and 250 feet long. It would give an open driveway of at least 30 feet through the proposed public square. It would give a 12 foot sidewalk on the north side of the square and one from 60 to 75 feet wide on the south side of it. In the square there would be room for a cab stand 40 feet deep and 225 feet long. A union waiting room for suburban trolley cars has been urgently needed for a long time. The plan also provides space for a union waiting station, 80 feet square. Two much-needed public comfort stations, each 20 by 50 feet, are also planned.

Another Municipal Coal Yard.

Lewiston, Me.—One hundred tons of coal, the first consignment for the Lewiston municipal yard, has arrived and been sold. From the cars the coal will be \$9 per ton. It was equally divided into stove and chestnut coal. Mayor Brann was given authority by the city council to establish a municipal coal yard in order to get relief from the \$12 price of coal. The consignment came from mines at Kingston, Pa., and ten more cars followed. It is planned to deliver as much of the coal from the cars as possible without incurring demurrage charges. The rest will be dumped into the yard and delivered immediately.

City May Use Either of City Halls.

Richmond, Cal.—The right of the city officials of Richmond to occupy either of its two city halls was established by Superior Judge A. B. McKenzie of Martinez when he sustained a demurrer filed by the city against an injunction restraining it from moving from the building on the Wall tract, south of the city, to the building on the Nicholls tract, east of the city. Both buildings are situated far from the center of the business section of the city, but both buildings were presents. Tired of being compelled to go so far from their places of business to reach the City Hall, many local business men began the circulation of petitions asking that the city build its own city hall and that it be located within the defined business district of the city.

NEWS OF THE SOCIETIES

Calendar of Meetings.

Jan. 17-18.—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting, New York, N. Y. Secretary, Charles Warren Hunt, 220 West 57th Street, New York, N. Y.

Jan. 18-19.—AMERICAN FORESTRY ASSOCIATION. Annual convention, Washington, D. C. Executive Secretary, P. S. Ridsdale, 1410 H Street, N. W., Washington, D. C.

Jan. 18-19.—INDIANA ENGINEERING SOCIETY. Annual meeting, Lafayette, Ind. Secretary, Charles Brossman, 1613 Merchants' Bank Building, Indianapolis, Ind.

Jan. 19.—AMERICAN SOCIETY OF ENGINEERING CONTRACTORS. Annual meeting, New York, N. Y. Secretary, J. R. Wemlinger, South Ferry Building, New York, N. Y.

Jan. 20.—WESTERN PAVING BRICK MANUFACTURERS' ASSOCIATION. Kansas City, Mo. Secretary, G. W. Thurston, 416 Dwight Bldg., Kansas City, Mo.

Jan. 22-23.—NATIONAL CIVIC FEDERATION. Annual meeting, New York City. Secretary, D. L. Cease, Metropolitan Tower, New York, N. Y.

Jan. 23-25.—CANADIAN SOCIETY OF CIVIL ENGINEERS. Annual meeting, Montreal, Can. Secretary, C. H. McLeod, 176 Mansfield St., Montreal.

Jan. 23-25.—AMERICAN WOOD PRESERVERS' ASSOCIATION. Annual meeting, New York City. Secretary, F. J. Angier, B. & O. Mt. Royal Sta., Baltimore, Md.

Jan. 25.—MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH. Annual meeting, Boston, Mass. Secretary, Dr. Francis H. Slack, Health Department, Boston, Mass.

Jan. 25-26.—ILLINOIS SOCIETY OF ENGINEERS. Annual convention, Chicago, Ill. Secretary, E. E. R. Tratman, Wheaton, Ill.

Jan. 31-Feb. 2.—OHIO ENGINEERING SOCIETY. Annual meeting, Ohio State University, Columbus, O. Secretary, John Laylin, Norwalk, O.

Feb. 5-12.—AMERICAN ROAD BUILDERS' ASSOCIATION. Seventh American Good Roads Congress and Eighth National Good Roads Show, Mechanics' Hall, Boston, Mass. Secretary, E. L. Powers, 150 Nassau street, New York City.

Feb. 7-9.—AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Midwinter convention, New York City. Secretary, F. J. Hutchinson, 33 West 39th St., New York City.

Feb. 7-9.—MINNESOTA SURVEYORS' AND ENGINEERS' SOCIETY. Annual meeting, Minneapolis, Minn.

Feb. 7-15.—TENTH CHICAGO CEMENT SHOW. Coliseum, Chicago, Ill. Secretary, Blaine S. Smith, 210 South La Salle Street, Chicago.

Feb. 8-10.—AMERICAN ASSOCIATION OF ENGINEERS. National convention, Hotel La Salle, Chicago, Ill. Headquarters, 29 La Salle Street, Chicago.

Feb. 8-10.—AMERICAN CONCRETE INSTITUTE. Hotel La Salle, Chicago, Ill. Secretary, Harold D. Hynds, 1418 Walnut Street, Philadelphia, Pa.

Feb. 9.—TEXAS TOWN AND CITY PLANNING ASSOCIATION. Semi-annual convention, Sherman, Tex. Secretary, J. E. Suratt, Secretary Chamber of Commerce, Sherman.

Feb. 12-14.—AMERICAN CONCRETE PIPE ASSOCIATION. Annual convention, Chicago, Ill. Secretary, E. S. Hanson, 538 South Clark Street, Chicago, Ill.

Feb. 15-16.—WISCONSIN ENGINEERING SOCIETY. Annual meeting, Madison, Wis. Secretary, L. S. Smith, 939 University Ave., Madison.

Feb. 19-24.—SOUTHWESTERN CONCRETE ASSOCIATION. Annual meeting and concrete show, Convention Hall, Kansas City, Mo. Chairman, Show Committee, Chas. A. Stevenson, 1433 West 10th Street, Kansas City, Mo.

April 17-19.—TRI-STATE WATER AND LIGHT ASSOCIATION OF THE CAROLINAS AND GEORGIA. Seventh annual convention, Macon, Ga. Secretary-treasurer, W. F. Stieglitz, Columbia, S. C.

May 8-10.—NATIONAL FIRE PROTECTION ASSOCIATION. Annual meeting, Washington, D. C. Secretary-treasurer, Franklin H. Wentworth, 87 Milk Street, Boston, Mass.

Nov. 12-16.—AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS. Annual convention, New Orleans, La. Secretary, Charles C. Brown, 469 Transportation Building, Chicago, Ill.

New Jersey State League of Municipalities.

The annual session of this convention was held at Trenton, January 9th and 10th. Officers were elected as follows: President, Mayor Frederick W. Donnelly, Trenton; vice presidents, Mayor George N. Seger, Passaic; Mayor Leighton Calkins, Plainfield, and Corporation Counsel Spaulding Frazer, Newark; secretary and treasurer, Tax Receiver Clinton J. Swartz, Trenton.

An executive committee was chosen as follows: George Brensinger, Jersey City; Daniel A. Garber, Ridgewood; William F. McAllister, Merchantville; Joseph Rabinowitz, Woodbine; Harry Bacharach, Atlantic City; Clarence E. F. Hetrick, Asbury Park; C. C. Justice, Pitman; Dr. Victor Mravlag, Elizabeth; J. P. Patton, Clayton, and W. Wilson, Metuchen.

In his address as president, Mayor Donnelly reviewed the history of the organization, remarking particularly the good work accomplished by the bureau of information maintained by the league. President John E. Gill, of the Trenton Chamber of Commerce, welcomed the delegates, the response being made by Mayor Seger of Passaic.

During the afternoon there was a general discussion of the subject, "Municipal Taxation, Finance and Codification of Laws Relating to Municipalities." Arthur N. Pierson, of Westfield, spoke on "Finances of New Jersey Municipalities;" Dr. Frederick A. Cleveland, director of the Bureau of Municipal Research, New York city, on "Opportunity for New Jersey—What Is Needed to Make the Executive Budget a Success;" George F. Brensinger, director of Revenue and Finance, of Jersey City, "Tax Assessment in Municipalities;" Edward F. Merrey, of Paterson, on "The Codification of Laws Relating to Municipalities."

At a dinner conference held in the evening the general subject, "New Jersey's Municipalities and Universities," was discussed. At the evening session, at the City Hall, the subject of "The Improvement of Municipal Government

and Administration," was featured. Nelson P. Lewis, chief engineer of the Bureau of Public Improvements, New York city, gave an illustrated lecture on "City Planning, What It Means and What It Includes."

At the luncheon conference held the second day at the Trenton House at noon, Governor-elect Walter E. Edge spoke on "Municipalities and the Legislature," while Mayor Bacharach, of Atlantic City; John B. Dullard, of Trenton, State Librarian; Clinton J. Swartz, local receiver of taxes; George A. Vieman, president of the New Jersey State Chamber of Commerce, and Mayor C. E. F. Hetrick, of Asbury Park, also made remarks.

In his speech, Mr. Edge declared that state problems cannot be solved without the co-operation of the municipalities. He referred to the problem of state roads as dealt with by the Egan act substitute, and said that the success of the proposition depends upon the attitude and actions of the various cities. He held that the arguments he has thus far heard advanced by municipalities against the workings of the measure are unsound. Mr. Edge further declared that it will be the cities that will be benefited by the new roads, and not the farmers through whose farms the state roads will pass. He said that the citizens of the state have forcefully expressed themselves as wanting the highway system, and outlined plans for financing the proposition.

The general subject taken up at the morning session was "Water Supplies, With Special Reference to the District Water Act and Garbage Collection and Disposal of New Jersey Municipalities." Morris R. Sherrerd, chief engineer of Newark, spoke on "State Conservation of Water Supplies;" H. B. Kummel, of Trenton, state geologist and acting director of the State Department of Conservation and Development, discussed "The Work of the Department of Conservation and Development in Its Relation to the Municipalities of New Jersey," and James C. Hallock, deputy engineer of Newark, talked on "Refuse, Collection and Disposal."

Mr. Kummel explained the workings of his department in connection with aid given in the various districts of the state. He dwelt upon the question of forest fires and stated that engaged in the prevention of such conflagrations there are 329 local fire wardens and eleven patrols. He also stated that shade tree work is carried on by many cities and boroughs and added that the board has no control over or responsibility for the work of local shade tree commissions.

Disposal of ashes and garbage at high temperature in order to destroy organic matter and germs, was advocated by Deputy Engineer Hallock.

At the closing session the league voted to hold its next annual meeting in Trenton. A summer session will take place in Atlantic City, Asbury

LEGAL NOTES

A Summary and Notes of Recent Decisions—
Rulings of Interest to Municipalities**Abolition of Office—Expiration of Term of Officer.**

(W. Va.)—The legislature may, by altering a city charter, abolish a municipal office, though the term for which a claimant thereto was elected has not expired.—*Booten v. Pinson*, 89 S. E. 985.

Care of Streets.

(Mo. App.) A city is not required to keep its sidewalks in a reasonably safe condition for travel, but to exercise ordinary care to keep them in that condition.—*Albritton v. Kansas City*, 188 S. W. 239.

Duty of City to Care for Walk on Private Land—Liability.

(Minn.) Where owner of building four feet from street constructs sidewalk along street line extending back to building, the city is not bound to take charge of extended walk, and is not liable for injury from defect therein.—*Holmwood v. City of Duluth*, 158 N. W. 827.

Maintaining Zoological Park—Governmental Function.

(Kan.) Maintenance of a zoological garden in public park by city is governmental function, so that city is not liable for injuries to visitors by animals through negligence of officers or agents in not properly confining them.—*Hibbard v. City of Wichita*, 159 P. 399.

Bond Issues—Purpose of.

(Mo.) No bonds can be voted in municipalities except for the general improvement of municipal facilities and all bonds issued by them must be designed to that end.—*State ex rel. Pike County v. Gordon*, 188 S. W. 88.

Municipal Improvements—Limitation of Cost.

(Ark.) The Constitution contains no limitation upon cost of municipal improvements except the implied limitation of cost to special benefits derived from the improvement.—*White v. Loughborough*, 188 S. W. 10.

Negligence of City—Where Rule Does Not Apply.

(Wash.) The rule exempting municipalities from liability for negligence in the matter of governmental functions does not apply to injuries sustained upon sidewalks, streets, and public places.—*Taylor v. City of Spokane*, 158 P. 478.

Pension System—Who May Receive Pensions.

(Wash.)—Seattle City Charter, art. 16, § 32, relating to payment of persons disabled while in civil service, establishes a pension system, so that, notwithstanding his previous recovery against the third party whose negligence disabled him, an employé might recover the benefits accruing thereunder.—*Engstrom v. City of Seattle*, 159 P. 816.

Low Unsuccessful Bidder—Devices—Merit.

(Cal. App.) A taxpayer interested in an unsuccessful bidder for contract for public improvement, whose bid was lowest, suing to enjoin award to a higher bidder, could not claim that, because the specifications did not provide for comparison of devices to be offered, the council had no authority to investigate their merits in awarding the contract, where such unsuccessful bidder co-operated with the council in making such comparisons.—*West v. City of Oakland*, 159 P. 202.

Public Improvements—Haul—Extra Pay.

(Mo.) Where a public improvement contract required extra work to be done only on written order, after agreement as to cost, and provided that the contractor should get the dirt for an embankment from property owned or acquired by the defendant, the contractor could not, in the absence of written order, recover at law on the contract for extra haul from land afterwards acquired by defendant, if there was no fraud or mistake.—*Mullins v. Kansas City*, 188 S. W. 193.

Paving Evidence—Assessments.

(La.) In the absence of fraud, acceptance by municipality of paving under contract, as authorized by Act No. 147 of 1902, is conclusive on abutting owner as to character of work, in suit to enforce assessment.—*Town of De Ridder v. Lewis*, 72 So. 447.

Illegal Municipal Contract—Setting Aside.

(La.) Contract involving expenditure of municipal funds and incurring of municipal debt in violation of prohibitory laws will be set aside at instance of citizens and taxpayers.—*Dunham v. Town of Slidell*, 72 So. 465.

City's Duty to Erect Barriers and Guards.

(Minn.) A city is not bound to erect barriers to prevent straying to dangerous places, but only to provide guards where the street itself is unsafe, from proximity of excavations, embankments, and the like.—*Briglia v. City of St. Paul*, 158 N. W. 794.

Powers of Municipalities.

(Ark.) Municipalities can exercise only such powers as are delegated to them by the Legislature, expressly or by necessary implication.—*Laprairie v. City of Hot Springs*, 187 S. W. 442.

Right of Pedestrian and Automobile.

(Ky.)—Pedestrian, in use of street at regular crossings, has same right to its use as vehicles, and is under no legal duty to give way to automobiles.—*Weidner v. Otter*, 188 S. W. 335.

Negligence in Providing Barriers—Liability.

(Minn.) Question of due care and negligence in providing barrier along street margin is usually for jury, but where risk is negligible, the court may declare non-liability as matter of law.—*Briglia v. City of St. Paul*, 158 N. W. 794.

City Water System—Proprietary or Governmental Powers.

(U. S. D. C.)—The enactment of an ordinance relating to the procurement by a city of a supply of water for its use and for its inhabitants, together with the price to be paid, involves the exercise of proprietary and not governmental powers.—*Wichita Water Co. v. City of Wichita*, 234 F. 415.

When Negligence of Individual Becomes Negligence of Municipality.

(Wash.) Where a negligent condition in a sidewalk or other public place of a municipality exists for a period of time which will hold municipality to constructive notice, negligence of a private individual or governmental agent becomes that of municipality.—*Taylor v. City of Spokane*, 158 P. 478.

Municipal Water System—State Control.

(Mont.) Where the city acquires a water supply system without resort to indebtedness or taxation beyond 3 per cent of the taxable property of the city, it stands on an equal footing with individuals and is subject to all reasonable regulation and control by the state under the police power.—*Public Service Commission of Montana v. City of Helena*, 159 P. 24.

Franchises—Forfeiture—"Condition"—"Manufacture."

City of Terrell v. Terrell Electric Light Company et al.—In an ordinance, granting to an electric company the "right to manufacture and vend" electricity to the city and the citizens, "subject to the provisions and conditions herein-after contained," which conditions were to furnish certain lights and not to erect an ice plant on a certain lot, it was not a "condition" that the company "manufacture" its own electricity rather than purchase it from another, since the grant should be construed according to *Vernon's Sayles' Ann. Civ. St. 1914*, art. 5502, providing that the ordinary signification should be applied to words not technical, and since a condition ordinarily is any qualification restriction or limitation modifying or destroying the full enjoyment or use of a right, and under the maxim that the "expression of one thing is the exclusion of another," the word "manufacture" cannot be construed as more than mere description of the extent of the permit.—*Court of Civic Appeals of Texas, Dallas*, 187 S. W. R., 966.

Park or one of the other seaside resorts of the state.

During the afternoon the general question of "Municipal Efficiency" was considered. Prof. Clyde Lyndon King, of the University of Pennsylvania, spoke on "Lower Living Costs in Cities," while Dr. William H. Allen, director of the Institute for Public Service, New York city, delivered an address on "Citizen Interest in Municipal Efficiency."

The conferrees referred to the executive committee, which will meet within a fortnight, the resolution offered by Commissioner George F. Breasinger of Jersey City, which advocates legislation requiring the assessment of railroad franchises on the same basis that other public utilities are assessed upon, or at the rate of three per cent on their gross earnings.

In his address on relations with public utilities, director Breasinger spoke in favor of local taxation for railroads, declaring the present method of assessment by the state unfair to the various municipalities.

Assemblyman Arthur N. Pierson of Union county, speaking on "The Fin-

ances of New Jersey's Municipalities," gave a symposium of the bills which will be presented during the present session of the legislature relating to municipal finances.

A resolution introduced by Mayor George N. Seger of Passaic, asking that favorable consideration be given by the Legislature to Commissioner of Charities and Correction Stockton's request for a liberal appropriation for increasing facilities for the care of the feeble-minded in New Jersey, was adopted.

The fullest publicity in all matters affecting municipal government was urged by Dr. William H. Allen, director of the institute for public service, New York City, in an address on "Citizen Interest in Municipal Efficiency." The establishment of complaint bureaus, where the grievances of residents may be heard and adjusted, and where valuable suggestions may also be received, the use of exhibits to show the city what has been accomplished, and other advances of municipal government were also suggested by Dr. Allen as making for greater civic interest and increased satisfaction among citizens.

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

Donnellson, Ia., is to construct a SEWER SYSTEM for which D. G. Fisher & Co., 213 Whitaker Building, Davenport, Ia., have been retained as engineers.

The city of Cumberland, Md., is studying the problem of WATER WASTE and has retained James H. Fuertes, 140 Nassau street, New York, N. Y., as consulting engineer.

Broken Arrow, Okla., is to construct SEWERS at a cost of \$30,000. The Mackintosh-Walton Engineering Company, 1023 State Bank Building, Oklahoma City, Okla., is to prepare plans.

Union Grove, Wis., is to construct a SEWER SYSTEM and DISPOSAL PLANT, to cost \$15,000. The engineer for this work is W. G. Kirchoffer, Madison, Wis.

Mitchell, Ind., contemplates the construction of WATERWORKS to cost \$115,000. R. M. Cass, 514 American Central Life Building, Indianapolis, Ind., is the engineer for the improvement.

Wabasha, Minn., is to extend its WATER DISTRIBUTION and SEWERAGE SYSTEM at a cost of \$30,000. The engineer for the work is J. F. Druar, 312 Commercial Building, St. Paul, Minn.

In improving the SEWERAGE SYSTEM of Toledo, O., the city is to accept the policies determined in consultation by city, county and state officials with William H. Hoad, Watson Harmon and A. A. Jones, of the University of Michigan, Ann Arbor, Mich.

In constructing an electric LIGHT PLANT, to cost \$10,000, Lenora, Kans., is to have as engineer, G. P. Taylor, Stockton, Kans.

Anoka, Minn., is to construct a new BRIDGE from plans and specifications prepared by L. P. Wolff, Germania Life Building, St. Paul, Minn.

In improving its WATERWORKS, Talequah, Okla., has retained E. B. Murray, 920 Walnut street, Kansas City, Mo., as consulting engineer.

Mayor Donnelly, of Trenton, N. J., is continuing his studies of the possibilities of local WATER POWER development and has been in consultation with Frederick W. Ballard, Cleveland, O.

Contracts have been awarded for the construction of a SEWER SYSTEM and SEWAGE DISPOSAL PLANT for which the Caldwell Engineering Company, Avers National Bank Building, Jacksonville, Ill., prepared plans and specifications.

Hanover township, Newtown, Pa., is to construct a 19-mile SEWER SYSTEM. The engineers retained on this project are Boyle and Howe, Bennett Building, Wilkes-Barre, Pa., associated with Clyde Potts, 30 Church street, New York, N. Y.

The common council of Rochester, N. Y., is at work on the problem of equalization and STANDARDIZATION OF SALARIES and is consulting in the work with A. Harrington Place, expert of the New York Bureau of Municipal Research, 261 Broadway, New York, N. Y.

County and City Health Officers of Kentucky.

The fifth annual school of instruction for Kentucky health officers was held at Louisville Dec. 11-15. Dr. John G. South, of Frankfort, president of the State Board of Health, presided and called the meeting to order, after which invocation was asked by Dr. E. L. Powell, of Louisville. President South made response to an address of welcome by Samuel W. Greene, County Judge of Jefferson county.

John D. Maguire, City Health Officer of Lexington, was the first speaker on the instruction program, his subject being, "The City Health Department: Its Opportunities and Difficulties." He told of various conditions in Lexington, regarded as having the best health ordinances of any city of its size in the United States, and pointed out marked decreases in death and sick statistics under model health ordinances.

Discussion led by Dr. W. E. Grant, City Health Officer of Louisville, was participated in by J. W. Harned, City Health Officer of Hopkinsville; C. H. Linn, City Health Officer of Paducah, and J. W. Trask, of Washington, D. C. The chief trouble in Paducah, according to Dr. Linn, is politics. He said changes in administration and subsequent appointments are so rapid that

(Continued on page 86.)

PERSONALS

Chittenden, W. J., Jr., has been appointed president of the Detroit, Mich., fire commission.

Crocker, Harold S., has been appointed city engineer of Brockton, Mass.

Enger, John, mayor of Hackensack, N. J., died January 8.

Funk, A. L., fire and police commissioner of Tulsa, Oklahoma, has resigned.

Hanrahan, Frank C., collector of Portsmouth, Va., has been placed in charge of the purchasing department.

Hubbell, Clarence W., has been appointed city engineer of Detroit, Mich., succeeding R. H. McCormick, who has resigned.

Lawrence, Charles, former head of the paving department, has been appointed city engineer of Warren, O.

McClave, Ross, has been elected engineer for Bergen County, N. Y.

Rourke, Fred, has been elected treasurer of Lowell, Mass.

Smith, Alex. Jr., has resigned as chairman of the public works committee of Waltham, Mass.

Smith, W. P., has resigned as city electrician of Cleveland, O.

Stevens, J. L., has been appointed city engineer of Mishawaka, Ind., succeeding Chas. C. Cole, who resigned to enter business.

Tinsley, D. W., has been appointed chief of police of Fitchburg, Mass.

Youngman, B. E., city engineer of Hazleton, Pa., has resigned. Jere Rough, his assistant, will probably be appointed to the position.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

GIANT FUEL OIL ENGINES.

Horizontal Type Engines for Low Grade Fuel.

The distinguishing features of design of the Giant Fuel Oil Engine are the horizontal position, the use of a crosshead and the use of a hot plate instead of a hot ball or electric ignition. The engine is of a straight line, single-cylinder type, guaranteed to run on any mineral oil of 28 degrees Beaume or lighter, containing not over 1 per cent sulphur. Most of the common crude oils, fuel oils and residuums are included in the guarantee, but satisfactory operation naturally depends on such characteristics as asphaltum content, freedom from sand, etc. As a number of suitable fuels have been obtainable at three cents per gallon, operation is found desirably cheap. Records kept of a number of engines show, in the fifty horsepower size, for example, fuel costs per hour of from 12 to 15 cents.

In this engine parts are relatively few and the construction is well suited to rough, heavy duty without skilled attention. The horizontal design, it is claimed, increases accessibility of the piston and all parts of the crank case. The crank shaft, for instance, can be taken out without taking off the flywheels by simply removing the main bearing caps and lifting it out vertically. The crosshead construction permits the crank end of the cylinder to be closed so that lubricating oil cannot reach the transfer port and splash lubri-

cation can be safely used. The use of the crosshead also permits both piston and cylinder to be shortened; friction is minimized and uneven cylinder wear prevented. The hot plate ignition is claimed to be particularly adapted to the firing of low grade fuels, as there is no trouble with carbon or bursting hot balls. Pre-ignition pressures are kept low, only 25 pounds more than the compression, so that higher compression can be used and operating fuel economy increased.

The main frame is of neat appearance and rugged construction. It is completely inclosed and alignment of parts and ease of inspection and adjustment are particularly emphasized features. The main bearings on 12 and 14-inch stroke engines are of extra large proportions and are cast integral with the frame. They are of the diagonal box type, babbitt lined. The position of the bearing on the frame causes the transmission of stresses due to the thrust of the piston to the bearing cap, when it becomes necessary to take up the bearings the action forces the shaft back to original alignment. The bearing caps are adjustable and provided with lugs which grip the frame.

The crosshead is of the single piece, box pattern, without adjustable shoes. This design is calculated to eliminate heating or pounding, and to considerably reduce bearing pressure. This construction is simple and cannot get or be put out of order. The crosshead

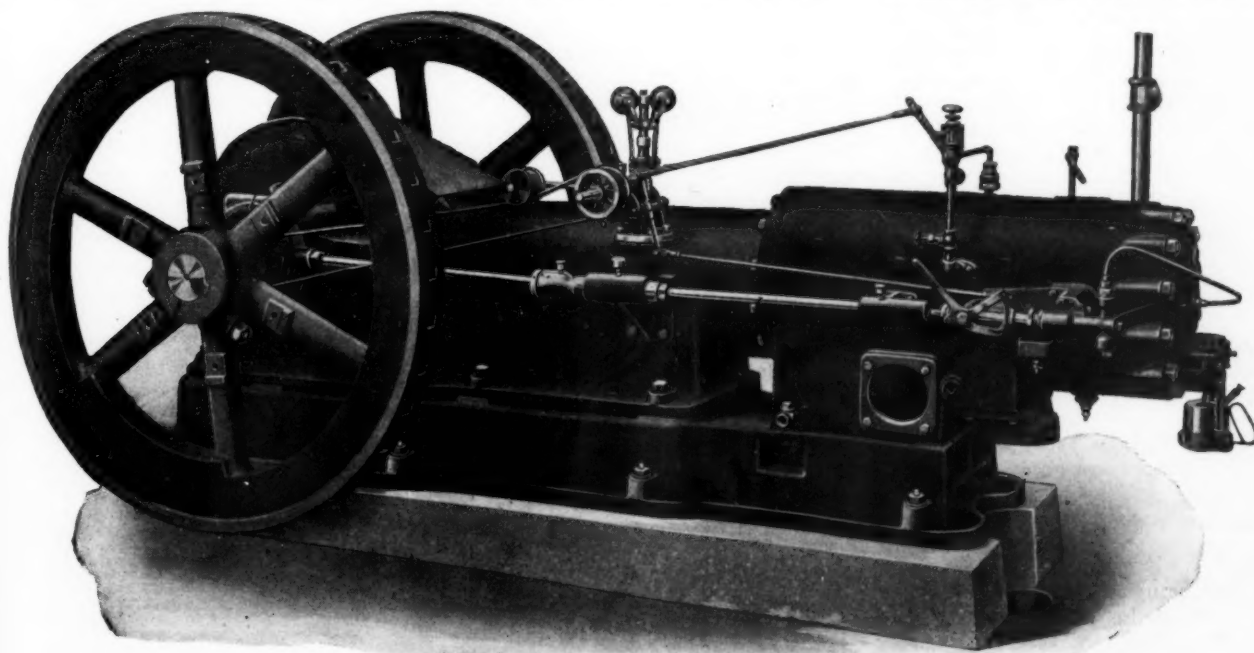
is of close grain cast iron. The connecting rod is an open hearth, high grade steel forging. The wrist pin end is of the solid type, fitted with bronze boxes having wedge adjustment. The crank end is of the marine type, babbitt lined.

The lubricating system is particularly simple—a positive self-oiling system for the main bearings, crank and crosshead pin and crosshead guide. The counterweights dip in a bath of oil at each revolution and the oil distributed, circulation being continuous. The cylinder is lubricated by a sight feed oiler of large size in the bigger machines.

The crank shaft is forged from open hearth steel—proportions are large and it is counter-balanced.

The three-port cylinder is particularly adapted to the fuel oil engine service and is of the valveless, two-cycle, low compression type. Water jackets are cast integral with the cylinder and cover only that portion in which combustion takes place. The cylinder head is a separate casting, completely water jacketed. Mounted inside the head is a concave malleable iron hot-head forming the rear wall of the combustion chamber. When the engine is in operation this plate is kept hot and it is, therefore, of great importance in vaporizing both the oil and water used in combustion and in maintaining a stable heat condition in the combustion chamber.

The piston is of the trunk type, made of cast iron and fitted with self-adjust-



CLASS A-O GIANT FUEL OIL ENGINE.

ing spring rings so designed as to eliminate catching and breaking. The deflector on the piston is designed to insure thorough scavenging of the cylinder at each stroke.

Fitted to the head of the piston is the malleable iron hot plate, which serves as an igniter for the oil. This plate forms the front wall of the combustion chamber and is so designed that the fuel charge is spread smoothly over its surface in a thin film which vaporizes instantly. A small pump injects the fuel against the hot plate, as it approaches the end of the compression stroke. The rapidity of the ignition makes it possible to inject the fuel into the cylinder late in the stroke, thereby avoiding the abnormal pressures of pre-ignition. Increased economy is secured by the use of water with the fuel oil. The water pipe enters the shell at a point just above the pure air port and the liquid is drawn into the combustion chamber with the pure air. The water reduces the flame propagation and thus keeps the initial pressure down to slightly more than the compression.

The quantity of both oil and water admitted is regulated by a simple, but sensitive fly-ball governor. Combustion is so complete by the time the exhaust port is opened that fuel loss is eliminated. The oil pump is of the positive plunger type, fitted with ball valves and operated from an eccentric on the crank shaft. The water regulator is very simple, consisting of a needle valve at all times under the control of the governor, and varying the admission of water to meet load requirements.

The hot tube in the fuel cylinder head near the bottom is used only for starting the engine. It is heated with a torch to a red heat, the torch being removed as soon as the engine starts. The smaller single cylinder engines may be started by hand, but for all the larger sizes and for duplex engines an air starter is furnished. The apparatus consists of a small, vertical, air-cooled, single acting air compressor driven by a gasoline engine of two horsepower.

Class A-O single cylinder Giant engines are built in eight sizes: 12, 20, 30, 40, 50, 60, 70 and 80 brake h. p. The class A-DO duplex engines are built in six sizes: 60, 90, 100, 120, 140 and 160 brake h. p. These engines can be used for many types of services, including electric generation and pumping, for small water supplies, for instance. Among the municipalities which have Giant fuel engine installations are the town of Dyersville, Ia., and the villages of Echo, Minn., Dwight, Ill., and Red Cloud, Neb.

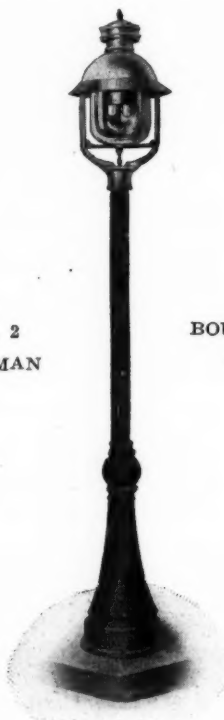
The Giant engines are made by the Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill.

COLEMAN BOULEVARD LAMPS.

For Park and Suburban Lighting.

The advantages of the street lamp unit burning its own fuel make it particularly well adapted for lighting parks and boulevards and the streets of small towns and city suburbs. It saves the cost of a plant constructed with a bond issue or the difficulties of a lighting under a franchise with a private company in a small community, and it allows the extension of the benefits of adequate street lighting to outlying sections of a larger city. The cost of installation, lighting and maintenance is lower than in the case of more elaborate systems, and the light given

NO. 2
COLEMAN



BOULEVARD
LAMP

is adapted to the illumination of any type of street.

The accompanying illustration shows a No. 2 Coleman boulevard lamp. The lamp consists essentially of a heavy cast iron post, a white-enameled steel dome, a solid brass burner with nickel caps, and a copper ventilator. The lamp makes and burns its own gas from gasoline or kerosene. The fuel is contained in the pipe section of the post, which is filled by a pump that forces in both the fuel and air. The pump measures the fuel and is adjusted to deliver only enough to burn the desired number of hours. There are two generators on the lamp and a valve to turn the light on or off at the top of the post. Only one pump is needed

for any number of lamps up to forty or fifty. The lamp is furnished with a cast base or anchor or with bolts to imbed in a concrete bed.

The lamps can be used either with two small mantles giving 300 candle-power or the larger standard rag mantles producing 1,000 candle-power. The boulevards of East St. Louis, Ill., have an installation of 60 of these lamps. The city parks of Des Moines, Ia., are illuminated by 425 of these lamps installed in 1913. Commissioner Zell G. Roe, superintendent of the department of parks and public property, has reported an operating cost of \$1.75 per lamp per month on all night service.

The No. 3 Coleman lamp is of the same general type but has the special feature of the automatic cut off. The supply tank in the base of the post holds 3½ gallons of fuel and the filling lasts a week. The fuel is carried up to the generator through a copper tube inside the pipe post. A clock and automatic cut off puts out the light at any desired hour.

The lamps described are made by the Coleman Lamp Company, Wichita, Kan.

INDUSTRIAL NEWS

Production of Petroleum.—Preliminary estimates by John D. Northrup, of the United States Geological Survey, Department of the Interior, indicate that the quantity of crude petroleum produced and marketed in the oil fields of the United States in 1916 was 292,300,000 barrels. This quantity is greater by 4 per cent. than the corresponding output in 1915, which reached the record-breaking total of 281,104,104 barrels. Mr. Northrup estimates that 38 per cent. of the 1916 total came from the Oklahoma-Kansas field, 30 per cent. from California, and the remaining 32 per cent. from the Appalachian, Lima-Indiana, Illinois, north Texas, north Louisiana, Gulf coast, and Rocky Mountain fields.

Fourteen Years of Cast Iron Pipe Prices.—The accompanying chart shows the course of prices for the past fourteen years on 6-inch cast-iron water pipe, f. o. b. New York City, in carload lots per ton of 2,000 pounds. The prices for the first 10 years were furnished by Daniel Runkle, at that time with the Warren Foundry & Machine Company, 11 Broadway, New York, and for the remainder of the period covered were averaged from weekly quotations in The Iron Age. The following table gives the data of the chart, the figures going back to 1900:

	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
January	\$27.50	\$21.75	\$24.50	\$29.25	\$24.50	\$28.00	\$29.75	\$34.25	\$27.00	\$24.50	\$25.50	\$22.00	\$22.00	\$25.00	\$22.00	\$20.00	\$29.00
February	26.75	22.25	25.00	29.25	24.25	28.50	29.50	34.25	26.75	24.25	25.50	21.50	22.00	24.75	22.00	20.00	29.33
March	26.75	21.50	26.25	30.75	24.25	26.75	30.50	34.00	26.25	25.25	25.50	21.00	22.00	23.87	22.00	20.00	29.75
April	26.50	22.00	26.00	31.00	24.25	27.00	29.75	33.50	26.25	25.00	25.50	21.00	21.25	23.50	22.00	21.60	30.50
May	26.00	22.25	27.75	30.75	24.00	27.25	31.00	34.25	26.25	25.25	25.50	21.00	21.00	23.00	20.88	22.00	30.50
June	24.50	23.00	28.00	35.75	23.50	27.25	32.50	33.50	25.75	26.00	25.25	21.00	21.00	23.00	20.50	22.25	30.50
July	24.75	23.75	28.50	30.75	23.50	27.25	30.25	34.00	25.75	26.25	24.00	21.00	22.10	23.00	20.50	22.50	30.50
August	23.50	23.75	29.50	29.50	23.50	27.75	30.50	32.50	25.25	26.00	23.50	21.00	22.00	23.00	20.50	23.25	30.50
September	22.25	23.50	29.50	29.00	23.00	27.25	31.00	33.00	25.75	25.75	23.50	21.00	23.12	23.00	20.40	24.37	30.83
October	21.75	24.00	29.50	26.00	23.25	28.25	33.00	33.50	25.75	25.50	23.00	21.00	24.50	23.00	20.00	25.25	31.50
November	21.75	24.50	30.75	24.50	25.00	29.00	33.25	28.50	25.00	25.87	22.12	21.40	24.12	23.00	20.00	26.50	35.50
December	21.75	23.75	29.25	24.25	27.00	29.25	35.50	28.00	25.50	25.70	22.00	22.00	24.62	22.33	20.00	27.60	41.00

The lower curve on the chart shows the prices of pig iron at the same periods, indicating how the cast-iron pipe quotations follow the pig iron fluctuations.

Cast Iron Pipe.—Chicago—At Cleveland the United States Cast Iron Pipe & Foundry Co. is the low bidder for 6,000 tons of pipe and at Madison, Wis., the low price has been quoted by the American Cast Iron Pipe Co. Quotations: 4-inch, \$44.50; 6-inch and larger, \$41.50; class A, \$1 extra. Birmingham—High prices of pig iron, necessitating the high price of pipe and, added to this, the usual dull season of the year, have caused quite a lull in the pipe market. Orders coming in were scattering. Quotations: 4-inch, \$39; 6-inch and upward, \$36; special lengths, \$1 extra. San Francisco—The latest advance has caused a general cessation of large business, either corporation or municipal; many buyers having anticipated their wants to some extent previously. Some small business is coming through for urgent needs, but the December tonnage was light. On the basis of the expected freight advance Jan. 1, prices are quoted here at \$49 per net ton for 6-inch and over; \$52 for 4-inch, and \$1 extra for class A. New York—The city of Lynn, Mass., which had advertised for the letting of 400 tons on Jan. 6, rejected all bids, but has not announced when new proposals will be received. Private buying keeps up well, numerous consumers making purchases without going through the formality of public advertising. Export inquiries are being received steadily, but manufacturers in this locality are not closing any considerable part of the current business of this character. Quotations: 6-inch, class B and heavier, \$41.50; class A, \$42.50.

Lead.—Lead is dull and unchanged in price. Quotations: New York, 7.50 cents; St. Louis, 7.325 cents.

NEWS OF THE SOCIETIES

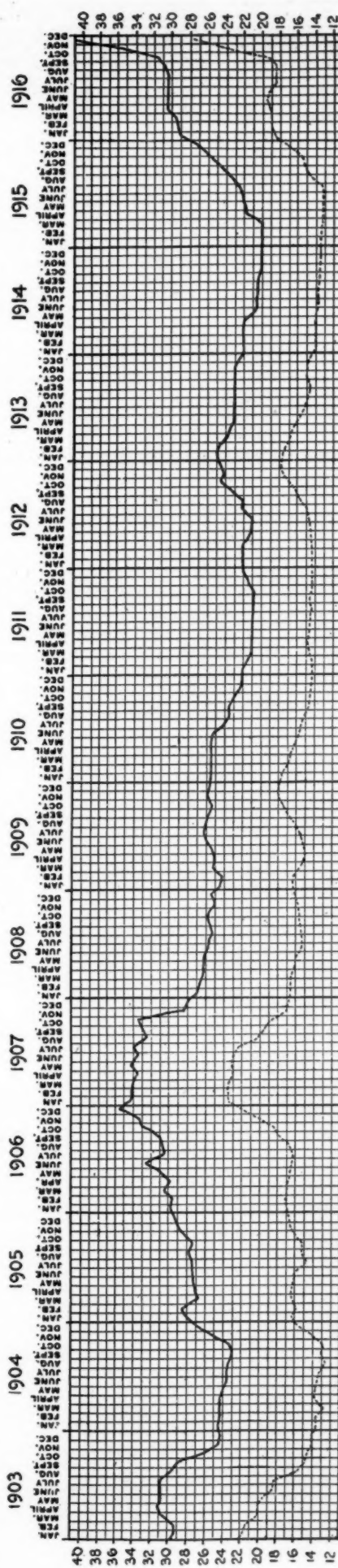
(Continued from page 85.)

new men have little opportunity to acquaint themselves with the workings of their departments before succeeded by another. Dr. Trask congratulated Kentucky as being the only state wherein universal vaccination is enforced. He suggested that Kentucky physicians refuse to purchase vaccine which has not been kept on ice.

Dr. Grant said that during the eight years preceding 1914, an average of 700 smallpox cases were reported annually in Louisville, whereas under compulsory vaccination, resulting in treatment of that nature being given 30,000 unvaccinated persons, the yearly average has been reduced to two cases.

A lecture on "Our Housing Problems" was delivered by Miss Marie Durning, of the Louisville City Health Department. Her talk was illustrated with slides.

The elimination of "part-time" Health Officers in Kentucky was



CAST IRON PIPE AND PIG IRON PRICES FROM 1903-1916.

avored in the closing address of the morning program, when P. E. Blackerby, of Erlanger, sanitary inspector of the State Board of Health, spoke on "The Opportunities of Present-day Health Officers."

Dr. Blackerby suggested that, as the day is coming with part-time Health Officers, or physicians who are appointed to devote but a small portion of their time to the public needs, will be a thing of the past. He favored education of the public by these part-time officers, and said that by this educational course the officers would prepare themselves for the time when they would be active all the time.

Drainage Association.

Arrangements are completed for the fourth annual meeting of the Drainage Association, which is to be held on the 22d and 23d of this month at West Palm Beach, Fla.

Among the addresses to be delivered are the following:

"Swamp and Overflowed Lands of Florida," R. E. Rose, state chemist.

"The Everglades," F. C. Elliot, chief drainage engineer.

"Reclamation by Drainage in the Upper Mississippi Valley," by Jacob A. Harmon, Peoria, Ill.

"Drainage Legislation," P. A. Vans-Agnew.

"Drainage Contractors," Ben Johnson.

W. S. Jennings, W. M. Marshall, J. A. Watson, H. C. Wood, H. S. Fairchild, W. A. Dutch and Robert Ransom will also appear on the program.

PHILIPPINE CIVIL SERVICE EXAMINATION.

Sanitary Engineer (Male), \$1,600.
February 7, 1917.

The United States Civil Service Commission announces an open competitive examination for sanitary engineer, for men only. From the register of eligibles resulting from this examination certification will be made to fill vacancies in this position in the Philippine Health Service, Philippine Islands, at \$1,600 a year, and vacancies as they may occur in positions requiring similar qualifications.

The duties of this position will involve engineering problems with regard to water supplies, sewage disposal, rat-proofing construction and drainage, and the preparation of plans and specifications for such projects.

Competitors will be examined in the following subjects, which will have the relative weights indicated:

Subjects.	Weights.
1. Mathematics	30
2. Sanitary engineering.....	40
3. Education and experience.	30
Total	100

Applicants must show that they have graduated in sanitary engineering from a college or university of recognized standing, or that they have had at least four years' experience in sanitary engineering work.

Persons who meet the requirements and desire this examination should at once apply for Form B. I. A. 2, stating the title of the examination desired, to the United States Civil Service Commission, Washington, D. C. Applications should be properly executed and filed with the Commission at Washington in time to arrange for the examination at the place selected by the applicant. The exact title of the examination as given at the head of the announcement should be stated in the application form.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
N. J.	Keyport.....	11 a.m., Jan. 19..	Warrenite on concrete; cost, \$65,000.....	J. M. Corlies, Dir. Board of Freeholders.
Ky.	Prestonburg	Jan. 19..	Improving several streets; cost, \$50,000.....	City Engr.
Tenn.	Murfreesboro	Jan. 19..	22,900 sq. yds. asphaltic concrete, 11,450 ft. concrete curb and gutter and 3,500 sq. ft. concrete walk.....	City Comrs.
Mich.	Bay City.....	Jan. 20..	Furn. crushed stone, gravel and cement for 1917.....	C. L. Fox, Secy Co. Road Commission.
Fla.	Lakeland.....	1:30 p.m., Jan. 20..	138,000 sq. yds. pavement.....	J. W. Turner, Engr.
Ind.	Connersville.....	2 p.m., Jan. 20..	Constructing concrete roads.....	Glen Zell, Co. Aud.
Wash.	Everett	Jan. 22..	20,000 sq. yds. concrete pavement, 2 miles of grading and 2,000 ft. of drain tile.....	W. C. Bickford, Co. Engr.
Cal.	Upland	Jan. 22..	Oiling, grading and improving streets.....	C. P. Fuller, City Clerk.
N. Y.	New York.....	10:30 a.m., Jan. 22..	4,300 yds. asphalt block; furnishing trap rock, binder stone and sand grit; 325,000 gals. tar road oil; 20,000 gals. bit. road material; 450,000 gals. asphalt road oil; 800 tons asphaltic cement; 50 tons of paving pitch; 4,500 bags of Portland cement, gravel, stone dust and sand	Douglas Mathewson, Pres. Bronx Borough.
N. Y.	New York.....	2 p.m., Jan. 22..	20,000 bags Portland cement, 500 tons refined asphalt, 600,000 gals. refined asphalt, 11,500 cu. yds. binder stone and 4,500 tons limestone dust.....	Comr. Pub. Works, Bur. of Highways.
Minn.	St. Paul.....	10:30 a.m., Jan. 22..	Grading alleys	H. W. Austin, Pur. Agt.
R. I.	Woonsocket.....	8:15 p.m., Jan. 22..	Furnishing curbing, cross walk, corners, etc.....	F. H. Mills, City Engr.
Ind.	Lebanon.....	7:30 p.m., Jan. 22..	Paving Indianapolis Ave.....	Wm. Smith, City Clerk.
Mich.	Detroit.....	10 a.m., Jan. 22..	Furnishing 1,000-ton bermudez asphalt; 2,100 tons asphaltic oil; sand and gravel; 2,000 tons refined asphalt; 5,000 tons limestone dust, and 2,500 tons asphalt stone.....	G. H. Fenkell, Comr. Pub. Wks.
Wash.	Everett	Jan. 22..	Two miles road work (concrete); cost, \$38,000.....	W. C. Bickford, County Engr.
Wis.	Milwaukee.....	10:30 a.m., Jan. 23..	Oil and stone trucks; constr. asphalt plant.....	F. G. Simmons, Comr. P. Wks.
O.	Cincinnati	noon, Jan. 23..	Paving with concrete and setting concrete curbs; laying 6-in. water main	Chief Engr., Dept. Pub. Serv.
Ind.	Indianapolis.....	10 a.m., Jan. 23..	Constructing gravel road	L. K. Fessler, Co. Aud.
Ky.	Pikeville	Jan. 24..	Co. road work; \$100,000 available.....	Co. Judge.
Ill.	Gillespie	2 p.m., Jan. 24..	13,790 sq. yds. brick pavement, curbs, etc.....	Board of Local Impts.
La.	Stuart Lake.....	2 p.m., Jan. 25..	Grading 12 miles of county road	Angus McDonald, Co. Aud.
Va.	Staunton	10 a.m., Jan. 25..	300,000 gallons binder and road oil.....	R. W. Moore, Supt. of Roads
Va.	Norton	Jan. 25..	Street improvements; cost, \$75,000.....	City Comrs.
La.	Lake Charles.....	Jan. 25..	12,000 sq. yds. of pavement.....	City Engr.
La.	Sidney.....	1:30 p.m., Jan. 25..	Furn. lumber, corrugated and concrete pipe; 800 ft. c. i. pipe; 1,000 tons gravel; constructing roads.....	R. B. Ellis, Co. Aud.
O.	Cincinnati	noon, Jan. 25..	Pav. with brick and macadam, constr. curbing, etc.....	Chief Engr., Dept. Pub. Serv.
N. Y.	Buffalo	11 a.m., Jan. 26..	Furnishing bitumen, paving stone, sand, curbs, gravel, broken stone, etc., for one year.....	A. W. Kreinheder, Comr. Pub. Works.
Ky.	Salersville.....	Jan. 26..	Co. road work; cost, \$30,000.....	Co. Comrs.
Va.	Clintwood	Jan. 26..	County road work, cost \$60,000.....	County Clerk
O.	Gallipolis	Jan. 26..	Street paving	L. C. Bean, Dir. Pub. Service
O.	Ravenna	noon, Jan. 27..	1,700 yds. brick pavement.....	S. B. Horsfall, Dir. Pub. Serv.
Ky.	Earlington	Jan. 28..	Three miles of road, \$15,000 available.....	City Clerk
O.	Ravenna	Jan. 28..	1,700 sq. yds. of brick pavement, slag base and stone or concrete curb	S. B. Horsfall, Dir. Pub. Serv.
Ind.	Winchester.....	10 a.m., Jan. 28..	Grading, paving and improving road.....	C. E. Tilton, Co. Aud.
N. J.	Layton	1 p.m., Jan. 29..	Grading with gravel surface.....	F. W. Tooker, Engr.
Fla.	Gainesville	Jan. 29..	Laying 15,000 sq. yds. brick pavement.....	H. E. Taylor, B. of Pub. Wks.
Ind.	Lebanon	Jan. 29..	Thirteen blocks brick pavement, cost \$25,000.....	Walter Whitecotton, City Eng.
Ky.	Hindman	Jan. 29..	Macadam street work; cost, \$40,000.....	City Engr.
Ind.	Evansville.....	10 a.m., Jan. 29..	Constructing county roads	C. P. Beard, Co. Aud.
Ind.	Winchester.....	10 a.m., Jan. 29..	Constructing county highway.....	C. E. Tilton, Co. Aud.
Minn.	St. Paul.....	10:30 a.m., Jan. 29..	20,000 brick paving blocks; 50,000 cement cross-walk blocks; 6,000 18-in. cement tile; 10,000 24-in. cement tile; 1,950 cu. yds. crushed limestone and 61 cars crushed granite or trap.....	H. W. Austin, Pur. Agent.
Wis.	Whitewater.....	2 p.m., Jan. 30..	Paving with wood, asphalt or concrete.....	A. N. Savee, City Clerk.
Ind.	South Bend.....	10 a.m., Jan. 30..	Constructing pavements	Board of Public Works.
Md.	Baltimore	noon, Jan. 30..	6.93 miles concrete highway; 780-ft. bridge over Sassafraz River	State Roads Commission.
Pa.	Wilkes-Barre.....	noon, Jan. 31..	Creosoted roadway and sidewalk on bridge.....	F. R. Hendershot, Co. Compt.
Va.	Wise	Jan. 31..	Street work in 1917, \$50,000 available.....	City Comrs.
Ky.	Ravenna	Jan. 31..	Street improvement; \$25,000 available.....	City Clerk.
Fla.	Jacksonville.....	4 p.m., Jan. 31..	2,575 square yards asphaltic, concrete pavement and 254 square yards vitrified block gutter.....	Comr. of Public Works, Highway Department, Main and Orange Sts.
O.	Springfield	noon, Jan. 31..	Paving streets, 9 jobs; cost, \$115,000.....	C. E. Ashburner, City Mgr.
O.	Urbana	Feb. 1..	Paving West Jefferson Rd.....	W. S. Coffey, Co. Aud.
La.	Cedar Rapids.....	Feb. 1..	Paving thirteen blocks; cost, \$90,000.....	T. F. McCauley, Engr.
Ill.	Cicero	Feb. 1..	8,290 sq. yds. asphaltic concrete pavement, and 5,800 feet concrete curb	Lewis Mangreig, Engr.
Va.	Appalachia	Feb. 1..	Street improvement; \$80,000 available.....	City Comrs.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Mich.	Zeeland	.....2 p.m., Feb.	1..Paving with brick, sheet asphalt, asphaltic concrete, asphalt block or concrete.....	City Clerk.
Ill.	Lincoln	.....Feb.	1..Paving streets; cost, \$70,000.....	W. C. Bates, City Engr.
Ind.	Bluffton	.....10 a.m., Feb.	1..Constructing stone roads.....	Will Johnston, Co. Aud.
N. Y.	Gowanda	.....Feb.	1..13,000 sq. yds. concrete pavement.....	F. J. Herzog, Clerk.
Tex.	Mt. Vernon	.....noon, Feb.	4..Constructing highway system complete.....	Judge Reeves, Co. Judge.
Ind.	Jeffersonville	.....10 a.m., Feb.	5..Constructing macadam road.....	G. W. Stoner, Co. Aud.
Ind.	Brownstown	.....1 p.m., Feb.	5..Three concr. roads, one tarvia mac. and one gravel.....	Albert Luedtke, Co. Aud.
Minn.	Montevideo	.....Feb.	5..17,537 sq. yds. of wood block pavement and 660 sq. yds. concrete or bitulithic pavement.....	B. O. Bonn, City Clerk.
Ind.	Williamsport	.....9 a.m., Feb.	5..Constructing 4,033 ft. of gravel road in Liberty Twp.....	E. W. Edwards, Aud.
Ind.	Kentland	.....2 p.m., Feb.	5..Constructing macadam road in Beaver Twp.....	S. R. Sizelove, Co. Aud.
Cal.	Berkeley	.....10 a.m., Feb.	5..Paving streets.....	G. E. Gross, Clerk, Co. Supvra.
Ind.	Connersville	.....2 p.m., Feb.	5..Constructing gravel road.....	Glen Zell, Co. Aud.
Ind.	Greenfield	.....10 a.m., Feb.	5..Constructing stone roads.....	H. J. Rhue, Co. Aud.
Ind.	Versailles	.....noon, Feb.	5..Constructing stone roads.....	J. F. Lochard, Co. Aud.
Ind.	Cannelton	.....noon, Feb.	5..Constructing macadam road.....	M. C. Conway, Co. Aud.
Ind.	Mt. Vernon	.....2 p.m., Feb.	6..Stone and gravel roads.....	J. R. Haines, Co. Aud.
Ind.	Wabash	.....10 a.m., Feb.	6..Five gravel and two stone roads.....	F. P. Kircher, Co. Aud.
Ind.	Spencer	.....1 p.m., Feb.	6..Two stone and gravel roads.....	S. M. Royer, Co. Aud.
Ind.	Bedford	.....1 p.m., Feb.	6..Constructing two gravel or macadamized roads, 8,775 and 10,987 ft.	D. H. Moffitt, Aud.
Ky.	Mt. Olivet	.....Feb.	6..Road work during 1917, \$30,000 available.....	County Clerk
Ind.	Kokomo	.....10 a.m., Feb.	6..Constructing gravel and stone roads.....	W. L. Benson, Co. Aud.
Ind.	Crawfordsville	.....10 a.m., Feb.	6..Gravel and limestone roads.....	Dr. W. F. Batman, Co. Aud.
Ind.	Corydon	.....2 p.m., Feb.	6..Constructing stone roads.....	E. A. Smith, Co. Aud.
Ind.	Brazil	.....10:30 a.m., Feb.	6..Constructing macadam roads.....	Sam C. Mauck, Co. Aud.
N. J.	Neshanic	.....Feb.	6..Constructing two stone and gravel roads.....	W. O. Graeser, Co. Aud.
Ind.	Auburn	.....10 a.m., Feb.	7..Constructing stone road.....	C. Van Cleef, Clerk, Twp. Committee.
Ind.	Lafayette	.....10 a.m., Feb.	7..Constructing stone road.....	S. P. Nelson, Co. Aud.
Ind.	Wabash	.....10 a.m., Feb.	7..Creosote block floor on bridge.....	G. W. Baxter, Co. Aud.
Ind.	Indianapolis	.....10 a.m., Feb.	8..Constructing gravel roads.....	F. P. Kircher, Co. Aud.
Ind.	New Albany	.....Feb.	8..Road construction.....	L. K. Fesler, Co. Aud.
N. J.	Camden	.....11 a.m., Feb.	12..Constructing gravel road.....	Emile Dupaquier, Co. Aud.
Ky.	Irvine	.....Feb.	12..1.5 mile state aid road construction.....	J. J. Albertson, Co. Engr.
Ill.	East Dubuque	.....4 p.m., Feb.	13..1,550 sq. yds. brick pavement on bridge.....	J. A. Alexander, Co. Clerk.
Ill.	Canton	.....Mar. 30..	Road work, \$20,000 available.....	M. Tschirgi & Sons, Engrs., Amer. Trust Bldg., Cedar Rapids, Ia.
Ill.	Virginia	.....April 1..	Road improvement; cost, \$14,000.....	E. F. Motsinger, Co. Highway Supt.
SEWERAGE.				
N. J.	Millville	.....3.30 p.m., Jan.	19..Constructing sewage pumping station and extending sewer system.....	Newton B. Wade, City Engr.
O.	Akron	.....noon, Jan.	19..Grading and constructing sewers.....	C. F. Beck, Dir. Pub. Service.
Minn.	Gaylord	.....1 p.m., Jan.	20..Constructing tile drains, cost \$7,000.....	Fred Hoppenstedt, Co. Aud.
N. Y.	New York	.....2 p.m., Jan.	22..Altering and improving sewers.....	Comr. Pub. Works, Bur. of Sewers.
O.	Akron	.....noon, Jan.	19..Sewers, grading and walks.....	H. A. Backderf, Clerk, Public Service.
Ind.	Mishawaka	.....11 a.m., Jan.	22..Constructing lateral sewer.....	City Engineer.
Utah.	Ogden	.....10 a.m., Jan.	23..Constructing relief sewers.....	Walter Richey, City Recorder.
N. Y.	Buffalo	.....11 a.m., Jan.	23..Constructing 24 to 36-in. sewers.....	A. W. Kreinheder, Comr. P.W.
Kan.	Dearfield	.....Jan.	23..Drainage system, cost \$11,000.....	W. Holbrook, Engr.
O.	Amherst	.....Jan.	23..Constructing sanitary sewers; cost, \$8,000.....	A. G. Menz, City Clerk.
Ia.	Dows	.....2 p.m., Jan.	23..Sewer system, requiring 50,000 ft. 6 to 15-in. sewer and one septic tank.....	M. Tschirgi & Sons, Engrs., Amer. Trust Bldg., Cedar Rapids, Ia.
Ind.	LaFayette	.....Jan.	24..8 1/2 miles 8 to 12-inch sewer.....	E. J. Vaughan, Clerk.
O.	Cincinnati	.....noon, Jan.	24..Constructing sewer extension.....	Chief Engr., Dept. Pub. Serv.
Pa.	Hanover	.....8 p.m., Jan.	24..Constructing 19 miles vitrified and concrete or cement segment sewers, 8 to 39 inches.....	Boyle & Howe, Twp. Engrs., Bennet Bldg., Wilkes-Barre, Pa., or Clyde Potts, 30 Church St., N. Y. City.
N. Y.	Brooklyn	.....11 a.m., Jan.	24..Constructing sewers in several streets.....	L. H. Pounds, Boro Pres.
N. Y.	New York (Bronx)	.....10:30 a.m., Jan.	25..1,952 ft. 156x108-in. sewer.....	Douglas Mathewson, Boro President.
Minn.	Crookston	.....10 a.m., Jan.	25..Constructing drainage ditches, cost \$8,000.....	H. J. Welte, Co. Aud.
Mich.	Detroit	.....10 a.m., Jan.	26..Constructing sewage pumping unit.....	G. H. Fenkell, Comr. Pub. W.
Mich.	Flint	.....Jan.	26..Constructing sewers and pavements.....	E. C. Shoecraft, City Engr.
Minn.	Granite Falls	.....1:30 p.m., Jan.	27..Tile drainage ditch; cost, \$22,000.....	G. H. Wilson, Co. Aud.
Minn.	St. Paul	.....10:30 a.m., Jan.	29..Constructing several sewers.....	H. W. Austin, Pur. Agt.
Minn.	New Ulm	.....Jan.	29..10,000 ft. tile drainage ditch.....	L. G. Vogel, Co. Aud.
Wis.	Whitewater	.....2 p.m., Jan.	30..Constructing storm sewers.....	A. N. Savelle, City Clerk.
O.	Springfield	.....noon, Jan.	31..Constructing 4 sewer jobs; cost, \$37,564.....	C. E. Ashburner, City Mgr.
Ill.	Cicero	.....Feb.	1..1,033 feet of sewers, cost \$2,100.....	Lewis Mongreig, Engr.
Wis.	Milwaukee	.....Feb.	1..48 and 51-in. sewers.....	J. H. Fowles, Secy Sewerage Commission.
Minn.	Buffalo	.....1 p.m., Feb.	2..Constructing drainage ditches; cost, \$15,000.....	J. A. Berg, Co. Aud.
Ia.	West Union	.....2 p.m., Feb.	2..20,000 ft. of sewers; cost, \$15,000.....	City Clerk.
Ind.	Plymouth	.....2 p.m., Feb.	3..Constructing tile ditch.....	A. W. Thomson, Constr. Comr.
Minn.	St. Peter	.....2 p.m., Feb.	5..Two tile drains.....	B. M. Gallagher, Engr.
Ia.	Rockwell City	.....Feb.	5..Disposal plant; \$10,000 available.....	F. E. Burnham, City Engr.
Ga.	Savannah	.....noon, Feb.	7..1,370 ft. concrete box storm sewer.....	E. R. Conant, City Engr.
Wis.	Chilton	.....Mar.	6..Constructing sewer system, cost \$22,000.....	Jerry Donohue, Engr., Sheboygan, Wis.
Ind.	Shelbyville	.....March	6..Constructing sewer.....	City Engr.
Ill.	Hillsboro	.....April	1..Constructing sewer system; cost, \$12,000.....	W. A. P. Warren, City Engr.
India.	Calcutta	.....2 p.m., June	1..Storm water pumping plant.....	C. C. Chatterjee, Sec. Corp. of Calcutta.
WATER SUPPLY.				
N. D.	Harvey	.....8 p.m., Jan.	19..60,000-gal wooden water tank.....	L. W. Miller, City Aud.
O.	Elyria	.....noon, Jan.	19..50 tons pipe, 150 tons iron sulphate, 100 tons lime, 500 meters and other fittings.....	M. M. Wilcox, Dir. Pub. Serv.
N. D.	Ardmore	.....2 p.m., Jan.	19..Water filter equipment.....	Bd. of Awards, Dept. or Agrl., Washington, D. C.
D. C.	Washington	.....2 p.m., Jan.	21..Filtering and sterilizing system.....	Chief Clerk, Engr. Dept., District Bldg.
Mich.	Detroit	.....2 p.m., Jan.	22..Furnishing 16,000 feet 4 and 6-inch c.l. pipe, 21 hydrants and 42 valves.....	R. A. Murdoch, Engr., 706 Free Press Bldg.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Mich.	Pontiac	1:30 p.m., Jan. 22	Extending pumping station; 1,200 tons 6 and 8-in. c. i. pipe; 4,000 ft. 8-in. steel or galvanized pipe; 35 tons c. i. specials; 90 tons pig lead; 757 tons lead pipe; 1,700 corporation and 1,350 curb cocks, 140 tapping valves and 50 6-in. gate valves.	L. A. Cambrey, City Clerk. F. G. Simmons, Comr. Public Works.
Wis.	Milwaukee	10:30 a.m., Jan. 22	Furnishing and laying four miles 12-in. c. i. pipe.	Lewistown-Readsville Water Co., 5 Valley St.
Pa.	Lewistown	7 p.m., Jan. 23	Water system; cost, \$180,000.	E. B. Kay, Con. Engr.
Ky.	Winchester	Jan. 25	Constr. reservoir and irrigation works.	G. Meriwether.
Tex.	Donna	Jan. 27	Water works and street improvement, cost \$50,000.	T. J. Asher, Co. Judge
Ky.	Pineville	Jan. 28	600 tons 10-in. c. i. pipe and 9 tons lead.	G. L. Bailey, Clerk
N. Y.	Mt. Morris	Feb. 1	One 6-in. and two 8-in. centrifugal pumps, direct connected to motors.	F. H. Williams, City Mgr.
Tex.	Brownsville	Feb. 1	Constructing water system, cost \$100,000.	F. G. Dessery, Engr., Central Building.
Cal.	Coalinga	Feb. 1	Furnishing material for construction reservoir.	Engr., Bd. of Water Comrs.
Minn.	St. Paul	10:30 a.m., Feb. 5	Additions to purification plant.	Board of Water Comrs.
Mich.	Flint	2 p.m., Feb. 6	1.5 miles water main construction.	City Engineer
Ill.	Watseka	Mar. 1	3.5 miles 24-inch water main extension; cost, \$90,000.	City Engineer
Ill.	Springfield	Mar. 1	Constructing water works system, cost \$45,000.	Jerry Donohue, Engr. Sheboygan, Wis.
Wis.	Chilton	Mar. 6	Installing meters; \$20,000 available.	C. G. Snow, Dir. of Pub. Serv.
O.	Mt. Vernon	April 1	Constructing water and light plant.	City Clerk.
Ill.	Gibson City	April 1		
MISCELLANEOUS.				
Wash.	Wenatchee	Jan. 19	Constructing U. S. post-office.	Supervising Architect, Treasury Dept., Wash., D. C.
D. C.	Washington	Jan. 19	Two power frames and 1 conveyor.	Board of Awards, Dept. of Agriculture
Ill.	Chicago	11 a.m., Jan. 20	100 miles hard-drawn copper wire No. 6; 10,000 ft. No. 8 soft-drawn copper wire; 400 pounds No. 6 copper tie wire.	W. G. Keith, Comr. Gas & El.
Tex.	San Antonio	11 a.m., Jan. 20	Traction engine and plough.	V. H. Howard, Co. Aud.
N. Y.	New York	2 p.m., Jan. 22	Making wash borings for tunnel.	Comr. of Pub. Works, Bureau of Sewers.
Utah.	Richfield	3 p.m., Jan. 22	Constructing U. S. post-office.	Supervising Architect, Treasury Dept., Wash., D. C.
Tex.	Houston	noon, Jan. 22	Constructing warehouse at Turning Basin.	E. E. Sands, City Engr.
Pa.	Aspinwall	7:30 p.m., Jan. 23	Collection and removal of garbage.	S. R. Chase, Boro Clerk.
Iowa.	Rockwell City	1 p.m., Jan. 23	Constructing drainage ditches.	R. B. Dixon, Co. Aud.
Ind.	Wabash	10 a.m., Jan. 23	Ornamental lighting system for Huntington St. bridge.	F. P. Kircher, Co. Aud.
Md.	Baltimore	noon, Jan. 23	Hauling 27,709 tons stone chips.	State Roads Comm.
Cal.	Berkeley	10 a.m., Jan. 23	Two oil storage tanks, 12,000 and 1,500 gals. capacity.	A. G. Briggs, City Clerk.
N. J.	Glen Ridge	8 p.m., Jan. 24	Collection of ashes and garbage.	John Brown, Boro Clerk, Herman St., Glen Ridge.
Md.	Baltimore	11 a.m., Jan. 24	400,000 ft. special duct pipe.	R. C. Thomas, Chief Engr.
Minn.	Crookston	10 a.m., Jan. 25	Constructing drainage ditch, cost \$6,000.	H. J. Welte, Co. Auditor
Pa.	Philadelphia	Jan. 29	Constructing concrete dry dock at navy yard.	Bureau of Yards and Docks, Navy Dept., Washington
N. J.	Trenton	Jan. 30	Four 1½ or 2 ton trucks.	W. P. Conrad, Dir. of Road Repairs
Cal.	Summerland	Jan. 30	Furnishing 3 4,000-ft. air blowers; 14 2 to 20-h. p. a. c. motors.	Board of Awards, Dept. of Agriculture, Wash., D. C.
D. C.	Washington	Jan. 30	Furnishing reinforcing material.	Supt. of Prisons, Dept. of Jus.
Pa.	Philadelphia	Feb. 6	Subway construction.	Wm. Twining, Dir. of City Transit
Minn.	W. Mn'p'l's.	7:30 p.m., Feb. 13	Constructing municipal gas plant.	E. A. Close, Recorder.
South Africa	Johannesburg	Feb. 15	Machinery for utilizing by-products at municipal abattoirs.	Municipal Council.
La.	Alexandria	8 p.m., March 7	Levee constr., requiring 2,000,000 cu. yds. excav.	Bd. of State Engrs., New Orleans Court Bldg., New Orleans.

STREETS AND ROADS

Opelika, Ala.—The Cocoa-Rockledge Indian River road district has voted in favor of a bond issue of \$300,000 to hard surface and widen the Dixie highway through that district. The money will be expended on the 34 miles of road that run down the Indian River through Cocoa, Rockledge, Sharpes, City Point, Bonaventura, Pineda and Eau Gallie. When completed the Cocoa-Rockledge section will be one of the best links in the great automobile road that extends from Mackinac to Miami.

Selma, Ala.—City soon to let contract improving streets. About \$50,000.

Fresno, Cal.—Council prepared to pave the alleys in blocks 87 and 88.

Fresno, Cal.—Fresno county board of supervisors plans to build a road 14 miles long from Firebaugh to Dos Palos; 62 bridges and culverts will be necessary. Board called for bids for the three largest, which will be wooden.

Denver, Colo.—Proposition to establish Alley Paving Dist. No. 43. Manager of improvements and parks has adopted specifications for constructing concrete pavement, and for the making of such incidental improvements, the alleys lying in blocks between Washington and Downing from 20th to 22d Aves.; Clarkson and Emerson Sts. from 22d to 23d Aves.; Ogden and Downing Sts. from 22d to 23d Aves.; Marion and Lafayette Sts. from 21st to 22d Aves.; Franklin and Williams Sts. from 21st to 22d Aves.; Williams and High Sts. from 22d to 23d Aves.; Williams and High Sts. from 24th

to 25th Aves. and High and Race Sts. from 20th to 21st Aves., in the city and county of Denver, state of Colorado. That the probable cost of said improvements as shown by the total estimate of the engineer is \$18,364.36.

Denver, Colo.—The old Florence & Cripple Creek Railway, abandoned and dismantled several years ago, is to again become a highway if the plans of Geo. Lewis, senator from Cripple Creek, materialize. The senator will try to have the right of way converted into an automobile boulevard. He has taken the matter up with the state highway commission.

Denver, Colo.—A proposition to establish alley paving district No. 44. Manager of improvements and parks has adopted specifications for constructing concrete pavement for the alleys lying in blocks between High and Race Sts. from 21st to 23d Aves.; High and Race Sts. from 24th to 25th Aves.; Race and Vine Sts. from 20th to 21st Aves.; 21st Ave. and Park Place from Race St. to Vine St.; Park Place and 22d Ave. from Race to Vine Sts.; Vine and Gaylord Sts. from 20th to 21st Aves.; Vine and Gaylord Sts. from 22d to 23d Aves.; York and Gaylord Sts. from 20th to 22d Aves.; and Colorado Blvd. and Albion St. from 23d to 25th Aves; total estimate of the engineer is \$12,789.66.

Washington, D. C.—Northeast Citizens' Association discussed erection of a garbage reduction plant and the widening of Benning road.

Ormond, Fla.—Merchants Bank of Daytona, successful bidder for street im-

provement and wharf bonds, \$35,000. Geo. W. Rigby, mayor.

Pensacola, Fla.—County commissioners agree to resurface road from Herrons Bayou to Lillian bridge over the Perdido River; is about 3½ miles long.

St. Augustine, Fla.—New Volusia county commissioners are desirous of placing the roads in good condition. The most important matter acted upon was relative to the immediate improvement of roads where permanent paving is being done. Paving on the east end of the Daytona-DeLand Rd., and on the Daytona-New Smyrna Rd. from Rose Bay to New Smyrna will be held up until April 15, and these roads will be put into good condition.

Valdosta, Ga.—S. B. Black of the engineering department of the University of Georgia has been making surveys of the road from Quitman to the Lowndes county line. He will make an estimate of the work and forward to the government engineers for approval.

Pocatello, Ida.—A resolution of the highway and light committee recommending that the call for bids for sidewalk district No. 2 be published, was adopted.

Springfield, Ill.—Architect W. H. Conway submitted plan for the beautification of the four sides of Public Square, showing arches removed, sidewalks lowered and ornamental lamps provided.

Connersville, Ind.—Bids received Jan. 27, 1917, at 2 p. m., by treasurer of Fayette county, for sale \$18,787.20 highway improvement bonds, 4½ per cent., ten years. Clyde Masters, Treasurer.

Goshen, Ind.—Bids received Jan. 27,

1917, at 10 a. m., by Treasurer of Elkhart County, for sale \$1,000 highway improvement bonds, 4½ per cent, 5 years. W. H. Winship, treasurer.

Greensburg, Ind.—Bids received Feb. 2, 1917, at 2 p. m., by Treasurer of Decatur County, for sale \$54,300 highway improvement bonds, 4 per cent, 10 years. Albert Boling, treasurer.

Indianapolis, Ind.—Resolutions adopted: North St. from Gray to Dearborn, grade and gravel; Germania Ave. from 10th to 12th, grade and gravel; Newman St. from 12th to Mass., permanent improvement and curb; Michigan St. from C. C. & St. L. Ry. Co. to Tibbs Ave., permanent improvement and curb; Newman from 12th to Brookside, cement walks; 40th St. from College to Winthrop Ave., permanent improvement; Valley Ave. from Roosevelt to Hazel, permanent improvement; Norwood St. from West to Missouri St., grade and gravel; Valley Ave. from Ludlow to Hazel, cement walks; Spaan Ave. from State to P. C. C. & St. L. Ry., cement walks; First alley east of Ruckle from Highland to Maple Rd., permanent improvement; Sugargrove Ave. (w. s.) from Indiana to 18th, curb and gutter; Brooks St. from 11th to 13th, cement walks, grade, gravel and curb; Oriental St. from Vermont to Michigan, cement walks and curb; Guilford Ave. from Watson Rd. to 1st alley north, cement walks; Garfield Pl. from 16th to 17th, permanent improvement; Tuxedo St. from St. Clair to Pratt, curb; North St. from Gray to Dearborn, curb; Guilford Ave. from 36th to Watson Rd., curb; Tacoma Ave. from 16th to 17th, cement walks and curb; North St. from Gray to Dearborn, cement walks; 1st alley north of Washington St. from DeQuincy to Riley, grade and gravel; 1st alley southwest of Virginia Ave. from East to Merrill, permanent improvement.

New Albany, Ind.—An extensive street improvement campaign next spring was taken by the Board of Public Works in ordering the improvement of Market St. between East 5th and East 13th, and directing Samuel T. Mann to make an estimate of the cost of the improvement of Spring St. from Silver to Beharrell Ave. through the newly-annexed territory. Specifications for the Market St. improvement provide for a 40-ft. vit. brick roadway and granitoid pavements on each side of the street.

Rensselaer, Ind.—Bids received Jan. 30, 1917, at 1 p. m., by Treas. of Jasper County, for sale, \$356.02 highway improvement bonds, 5 per cent, two years. J. P. Hammond, Aud.

Rochester, Ind.—Bids received Feb. 3, 1917, at 2 p. m., by Trustee of Rochester Twp., Fulton County, for sale, \$18,000 school bonds, 4½ per cent, 15 years. Wm. K. Stevenson, Trustee.

Rockport, Ind.—Bids received Feb. 5, 1917, at 4 p. m., by treasurer of Spencer county, for sale \$12,800 highway improvement bonds, 4½ per cent., ten years. James A. Haines, Sr., Treasurer.

Spencer, Ind.—Bids received Feb. 3, 1917, at 2 p. m., by Treasurer of Owen County, for sale \$26,774.88 drainage bonds, 5 per cent. S. M. Royer, auditor.

Sullivan, Ind.—Plans and specifications for 10½ miles stone roads will be constructed by county. Work will be let in March. W. L. Sisson, County Surveyor.

Avoca, Ia.—Town plans 20 blocks paving. About \$65,000.

Cedar Rapids, Ia.—The following bonds will be submitted to the voters at the March election: Parks and playgrounds, \$450,000; highway, \$450,000.

Davenport, Ia.—Scott county will oil, grade and tile 10 miles of road. Program calls for the oiling of a mile and a half of the River road, four miles of the River-to-River road, and one and a half miles of the Long Grove road. Work will be begun about April 1. Will also include the reoilng of the nine miles of road that was surfaced last year. The approximate cost of oiling, grading and tilling a mile of road is \$300. Specifications for bids are being prepared by County Engineer M. J. Malloy.

Des Moines, Ia.—The Iowa highway commission declares that "the only kind of surfacing that can be used extensively on the roads of this state under present conditions is gravel or some equally low cost material," in the report for the year ending Dec. 1, 1916, filed with Gov. Clarke.

Keokuk, Ia.—City plans 3 miles paving in spring. J. F. Winters, City Engr.

Marshalltown, Ia.—Board of Supvrs.

authorize the issuance of \$63,000 county bonds.

Marshalltown, Ia.—Board of supervisors are to combine with the Marietta road work and let both in one contract. In addition to grading, shaping and graveling the county's share of the road will include the grading of a mile of the South Center St. road. In yardage of earth to be moved the latter will be a larger contract than the 4½ miles of the Marietta Rd.

Marshalltown, Ia.—A petition is being circulated for paving South 5th St. from Linn to Railroad Sts. and on Summit St. from 9th to 13th St. A petition on file for Jerome St., from 5th to 7th St.

Waterloo, Ia.—Mayor's program. The tentative list of streets to be paved follows: West Section—Falls Ave., Manhard St., Beck Ave. and Duryea St.; Miles St. and Commercial St.; Baltimore and Denver Sts., Summit Ave., Moir St., Marsh St.; Reber Ave., Kimball Ave., Third Ave., Kingsley Ave., Sunset road, Fourth St., Williston Ave., Vermont St., Bayard St., Baltimore St., Bertsch Ave., Ninth St., Bertsch Ave., Hawthorne Ave., Eighth St., between Wellington St. and Grant Ave.; Grand Ave., Randolph and Wellington St., Leavitt St., Seventh Ave. from Allen to Grant Ave., Grant Ave., Sixth from Wellington to Allen, Allen from Fifth to Seventh, Hammond Ave., Forest Ave., Bluff from Forest Ave. to La Porte road, Jefferson St., Eighth, Ninth and Tenth Sts., First St. between Washington and Commercial and Second from Washington to Jefferson, Commercial St., Great Western tracks and Park Ave., Third Ave., Jefferson St., Cedar St. East Section—Sycamore St., Lafayette St., Linden Ave., Franklin St., Elm St., Lane St., Prospect Ave. and Alta Vista Ave., Glenwood St., Irving St., Parker St., Burton Ave., Conger St., Chautauqua Park, Lafayette St., Park road, Vinton St.

Hutchinson, Kan.—Reno County to build a strip of concrete road, about 400 ft. long, 16 or 18 ft. wide; will extend from south approach of the new concrete bridge now under construction south of Nickerson. W. B. Harris, Co. Engr.

Wichita, Kan.—Ordinance approved that the benefit district for the opening and widening of the alley between Osage Ave. and Walnut St. from Mentor Ave. to University Ave.

Jena, La.—Citizens are making arrangements for model highway to connect up with the Jefferson Highway, which touches a portion of Winn parish.

Lake Charles, La.—Ordinance providing for the paving of Miller Ave. from east side of Ryan St. to the west side of Hodges St., be paved with a pavement of vertical fibre brick. Contract, plans and specifications now on file in the office of the commissioner of streets and parks.

Huntington, L. I.—Highways resurfaced or rebuilt within the year. New York Ave., extending from the tunnel at the tracks of the Long Island Railroad at Huntington Station through Huntington Village to Salesite, and the regular state highway extending from Fort Salonga to Northport, from Northport to Huntington and from Huntington through Cold Spring Harbor to the Nassau county line. The new surface will be of concrete.

Baltimore, Md.—Paving Comrs. are negotiating with Knoxville contractors relative to bids on \$2,000,000 worth of Baltimore St. paving.

Fitchburg, Mass.—Extension of Kimball St. from Franklin St. to Putnam St. is one of the big projects which is likely to be taken up by the city council this year.

Greenfield, Mass.—Town Engineer E. S. Warner recommends that fund be provided his department whereby more enduring material may be used for road construction than gravel or water bound macadam. Deerfield, Federal, High and Shelburne Sts. are the main arteries for traffic into and out of town.

Lawrence, Mass.—Alderman Finnegan will inspect the bitulithic paving in New York City. He intends to ask for the passage of a street improvement loan. Some block paving will have to be done, including a section of valley St., Amesbury St., Park St. and Merrimack St.

Norton, Mass.—Legislature to be requested to appropriate \$20,000 for the purpose of adding a stretch of state road

to the main road between Taunton and Norton.

Pittsfield, Mass.—County commissioners conferred with state highway commissioner relative to the state highway work to be done in Berkshire County during the year.

Salem, Mass.—Certain imperative improvements will be urged on the city government by the residents of Pigeonville through Mayor Benson by the presentation of a resolution adopted. North St. to be permanently resurfaced; Bradford St., Goodell St., Liberty Hill Ave., Sylvan, Oakland, Mason, Grove, Flint and Dunlap Sts. be properly laid out. Crossings to be laid on Nursery St. from Bennett's to Hinkley's lot on Fairmount St., northwest side. Brook off Bradford St. to be drained and filled.

Salem, Mass.—Mayor Benson favors appropriating a sum of money sufficient to cover the cost of resurfacing Essex St. between Town House square and Washington square east.

Springfield, Mass.—Italian business men favor early completion of the Water-Fulton St. widening.

Worcester, Mass.—Street Comr. Albert T. Rhodes in his annual report to Council, for relief of congestion on Pleasant St., recommends double tracks from Newton Square to Main, and widening of Highland St.

Detroit, Mich.—Water works park is to have a 40-ft. boulevard reaching from Jefferson Ave. to the river along its east side.

Pontiac, Mich.—Board of supervisors to issue \$25,000 additional road bonds before March 15, 1917. This will be in addition to the \$250,000 which is to be used in this year's road building schedule. Bids opened Jan. 23.

Pontiac, Mich.—Bd. of Supvrs. accepted the bid of the Harris Trust & Savings Bank and the Detroit Trust Co. for the \$250,000 county road bonds at par and pay accrued interest and premium of \$9,715 in addition to printing the bonds.

St. Johns, Mich.—A petition for the construction of 6½ miles of state road in the townships of Essex and Bengal has been presented to the county road commissioners.

Duluth, Minn.—The first pavement to be authorized for 1917 will be Second Ave. east, from Second to Seventh St. A resolution ordering the improvement will be introduced; will cost about \$25,000, of which the city's share will be \$6,000.

Duluth, Minn.—City Comrs. decided to spend the \$50,000 appropriated in the permanent improvement fund for small pavements throughout the city.

Port Gibson, Minn.—New bids will be asked for 14,000 sq. ft. of cement paving. Address mayor.

Winona, Minn.—See "Sewerage."

Bucatunna, Miss.—Seventy-five representatives from all Alabama and Mississippi counties between Meridian and Mobile perfected plans for completing the Meridian-Mobile highway which is to join the Jackson highway at Meridian.

Decatur, Miss.—The election to issue Beat 3 road bonds of \$30,000 was successful.

Meridian, Miss.—Mobile is interested in the Meridian-Mobile Highway, and looking to the construction of this road.

Carthage, Mo.—Sidewalks were ordered in on Mound St. from Elm St. to Meridian St. and on the west side of Meridian St. from Central Ave. to Mound St. and on the east side of Grant St. from Central Ave. to Second St.

Beatrice, Neb.—The City Comrs. are planning to pave several streets. Address City Engr.

Lincoln, Neb.—State Land Comr. G. L. Shumway, who is a member of the State Bd. of Irrigation and Highways, favors laws for the building of dirt roads in preference to the more expensive hard or paved roads. He advocates the construction of inter-county roads made of dirt, of ample width and well drained, with proper mixture of clay, sand and gravel, and limestone where available for a binder. The dirt road can be maintained at an annual cost of \$50 a mile; the materials are at hand in Nebraska and the cost of building will be about 15 per cent of the cost of hard roads. The farmers favor this sort of a road and he believes motorists generally will join with the farmers in this kind of road improvement.

Bayonne, N. J.—Petition granted by board of commission W. 55th St., from Ave. C to Broadway, to be improved.

in the manner following: The entire width of the street to be regulated and graded. New bluestone curb to be set in concrete on each curb line, present curb to be redressed and reset in concrete. New concrete sidewalk, 5 ft. wide, to be laid on each sidewalk.

Bayonne, N. J.—Petition granted for street improvement. W. 12th St., from the Dummy Rd. to Broadway, to be opened.

Bayonne, N. J.—Ordinance introduced for the improving of W. 39th St., from Ave. B to Broadway, to be improved in the manner following: New concrete sidewalk, 4 ft. wide, to be laid on each sidewalk; old sidewalk to be adjusted or relaid. New concrete curb and gutter to be set on each curb line; old curb and gutter to be adjusted or reset or replaced. The entire width of the roadway, from gutter to gutter, to be paved with sheet asphalt on a 5-in. concrete base.

Garfield, N. J.—A resolution by Councilman Arthur Noack directing Borough Clerk John A. Dwyer to communicate with the Freeholders of Passaic and Bergen counties in an effort to have the Freeholders place a sidewalk on the outside of the Outwater lane bridge. Also recommended that the street committee authorize the placing of crushed stone on Prospect St., between Outwater lane and Union place.

Newark, N. J.—An expenditure of \$1,000,000 in road improvement work during the present year is being considered by county officials.

Trenton, N. J.—Freeholder William P. Conard, head of department of road repair, will recommend to the board the purchase of four 2-ton gasoline automobile trucks; advertise for bids for carting stone other than that handled by the auto trucks.

Albany, N. Y.—The Highway Department is devising a plan whereby the state can secure \$3,500,000 of Federal road money without going to the people with another bond issue. The Federal statute demands that the state shall match the Federal appropriation dollar for dollar. The state road system will consist of about 10,000 miles, reaching every village in the state and every city from several directions. This is about one-quarter of the market highway mileage of the state.

Amsterdam, N. Y.—Highway engineers will make a survey for road work from Glen to road 298, in the town of Florida. On the completion of this survey one will be made from Broadalbin to Fish House, in Fulton County.

Olean, N. Y.—Mayor Studholme in his message recommends that in making up the budget, repairing Kittanning Ave. be given some consideration. Also improvement of Sixth St. from Henley to Washington St.

Rochester, N. Y.—A first ordinance for the extension of Maplewood Terrace at a cost of \$1,000, two final ordinances, for Selo St. walks from Main St. East to East Ave., at a cost of \$3,500, and for the construction of a block asphalt pavement in Atlantic Ave. from Culver Rd. to Winton Rd. at a cost of \$87,500, were adopted by the council.

Rochester, N. Y.—See "Water Supply." **Syracuse, N. Y.**—Ordinances adopted designating asphalt as the material for resurfacing North State St. from North Salina to Catawba.

Syracuse, N. Y.—See "Miscellaneous."

Watertown, N. Y.—Chamber of Commerce to ask Commissioner of Highways Duffy that the Watertown-Evans Mills road to be designated for construction this year as well as road from Lafadegville to Fishers' Landing.

Yonkers, N. Y.—Council authorized City Engr. to prepare plans and specifications for the permanent paving of Elm St. from Nepperhan Ave. to Walnut St. and thence in Walnut St. to Ashburton Ave.

Asheville, N. C.—City commissioners authorized bonds probably between \$70,000 and \$90,000 to cover the cost of last year's street paving.

Asheville, N. C.—Commissioner of Public Works Stikeleather recommended that Patton Ave. be paved with asphalt.

Asheville, N. C.—Plans for the spring road work of the county will soon start, according to statements of the two county commissioners. It is understood that reconstruction work and the rebuilding of wrecked bridges will be pushed.

Asheville, N. C.—A petition to widen Haywood St. from Government St. will be presented to the Council.

Catherine Lake, N. C.—Road bonds of

\$10,000 purchased by Messrs. W. L. Slayton & Co., Toledo.

Tarboro, N. C.—Aldermen plan paving of Trade, St. Andrews, St. Patrick and all cross streets leading from these into Main St.

Fargo, N. D.—City Engineer F. L. Anders filed with the city auditor plans and specifications for paving proposed to be done next season and estimated as costing from \$293,000 to \$391,000, according to the kind of paving installed. In his estimates of cost on the various jobs separate figures are for each kind of pavement on which bids are expected to be asked. Estimates are as follows: Job No. 133—Asphalt, \$97,000; bituminous concrete, \$86,000; bitulithic, \$94,000; creosote block, \$109,000; brick, \$112,000; Portland cement concrete, \$85,000; Job No. 134—Asphalt, \$157,000; bituminous concrete, \$140,000; bitulithic, \$152,000; brick, \$182,000; creosote, \$177,000; Portland cement concrete, \$135,000; Job No. 135—Asphalt, \$3,600; bituminous concrete, \$3,200; bitulithic, \$3,500; brick, \$4,200; creosote block, \$4,000; Portland cement concrete, \$3,200; Job No. 136—Asphalt, \$80,000; bituminous concrete, \$71,000; bitulithic, \$78,000; brick, \$93,000; creosote block, \$90,000; Portland cement concrete, \$70,000.

Wahpeton, N. D.—Paving principal street considered by council during summer.

Williston, N. D.—Paving for approximately one-half mile of the streets in the business section of the city are among the plans of the city commission for the coming summer, according to an announcement by Street Commissioner W. S. Davidson. Cement gutters for the residence streets and city control and maintenance of the boulevard and parking system are also plans under consideration.

Silver City, N. M.—Grant County plans an election for the issuance of \$300,000 in bonds for road building.

Canton, O.—Resolution for the paving of Navarre Rd. S. W., from Harrison Ave. to the west corporation line, was adopted and referred to the street committee.

Canton, O.—Stark county's first scientifically constructed gravel road is to be built this summer. Will connect New Berlin and Hartsville Highways.

Canton, O.—Ordinances passed for the improvement of Webster Ave. N. E., Edward Ave. N. E., and Bedford Ave. S. W.

Canton, O.—Resolution declaring it necessary to improve Edward Ave. N. E., from 13th St. N. E., to 17th St. N. E., by grading to the established grade, setting stone or concrete curb, laying sawed stone or concrete sidewalks, vitrified street paving brick crosswalks and providing the necessary drainage. Henry A. Schrantz, President of the Council. W. Edgar Jackson, Clerk of Council. Chas. A. Stolberg, Mayor.

Canton, O.—Resolutions to improve Bedford Ave., S. W., from Seventh St. S. W., to 12th St. S. W., by grading to the established grade from Seventh St. S. W., to 11th St. S. W., and to the proposed grade hereinafter set forth from 11th St. S. W., to 12th St. S. W., setting stone or concrete curb, laying sawed stone or concrete sidewalks, constructing vitrified brick crosswalks and necessary storm water drainage.

Cincinnati, O.—Resolution approved to improve Central Ave. from north line of Liberty St. to Colerain Ave., by resetting existing granite curbs, setting new granite curbs, resurfacing the roadway with granite, constructing the necessary drains and inlets and replacing the existing 4-in. water main with new and larger water mains.

Cincinnati, O.—Resolution approved to improve Boudinot Ave. from north line of Wardall Ave. to North line of Phoenix Ave., by grading, constructing concrete curbs, paving the roadway with brick, constructing the necessary drains and inlets and extending the existing 6-in. water main.

Cincinnati, O.—Resolution approved to improve Central Ave. from north line of Fourth St. to north line of Liberty St., excepting the portion from the south line of Eighth St. to the north line of Ninth St., by resetting existing granite curbs, setting new granite curbs, paving the roadway with wood block, constructing the necessary drains and inlets and replacing the existing 4-in. water main with new and larger water mains. Director of Public Service.

Cincinnati, O.—Ordinance approved to

establish the grade of Tallant Ave. from Forest Ave. to Haven St.

Cincinnati, O.—City may pave Madison Ave. road with bitulithic and brick from Erie Ave. to the B. & O. Railroad.

Circleville, O.—Road improvement bond of \$2,000 purchased by the First National Bank of Circleville. Fred R. Nicholas, county auditor.

Cleveland, O.—Approximately \$2,000,000 is scheduled to be expended during the year 1917 in road improvements in Cuyahoga County according to County Engineer W. A. Stinchcomb. Of this sum about \$800,000 will be paid by Cuyahoga County, \$64,000 by the state highway commission, and the remainder by the townships and villages and adjoining property owners. Road improvement plan has under contemplation the following county roads. It was stated that available money will not permit improvement of all these roads this year and that some may be eliminated. Roads to be improved and the kind of improvement are now being decided upon by the county commissioners. The list includes: Anderson Road, from Green Road to Richmond Road; Bagley Road, from Berea village to Wooster Pike; Brookpark Road, from Wooster Pike to Broadway Road; Cedar Road, from Green Road to Chagrin River Road; grading; Chardon Road, new location Euclid village; grading; Chagrin River Road, Mayfield Road to Willson Mills Road; Dover Center Road, from Butternut Ridge to W. Lake Road; Detroit Ave., from W. 117th St. to Rocky River; Gessner Road, grading; Hall Road to Coe Ridge Road; Harvard Ave. through Newburg Heights village; Hall Road from Coe Ridge to Lake Road, concrete; Hathaway Road from Canal Road to Fisher Road; Highland Road from end of bridge to top of hill; Lee Road from Monmouth to Superior Road; Linn Road from Ridge Road to Linn Road; Lynn Road from E. Lake Road to county line; McCracken Road from Bedford Road to Lee Road; Pleasant Valley Road No. 1 from Wooster Pike to State Road; Pleasant Valley Road No. 2 from State Road to Broadview Road; Pleasant Valley Road No. 3 from Broadview Road to Brecksville Road; Porter Road from Coe Ridge to Center Ridge Road; Prospect Road from Depot Road to Drake Road; Puritas Springs Road from Berea Road to Grayton Road; Ridge Road from Denison Ave. to railroad; Royalton Road from State Road to Brecksville Road; Royalton Road from Wooster Pike to county line; School-Elm-Main Bridge St. to East End; Smith Road from Brookpark to Wooster Pike; Stump Road from Brookpark to south line; S. O. M. Center Road from N. Woodland to N. Miles Ave.; S. O. M. Center Rd. from S. Miles to county line; York Road from Royalton Road to Bennett Road; W. Lake Road through Rocky River; Windfall Road from city limits to Bedford Road; Bennett and Drake Road from York Road to Wooster Pike.

Elmore, O.—The Bank of Elmore was the successful bidder for street improvement bonds for \$7,480.

Gibsonburg, O.—Messrs. Durfee, Niles & Co., of Toledo, were the successful bidders for storm sewer improvement bonds for \$2,247.75. Merritt Mason, Village Clk.

Hamilton, O.—City council retained City Engineer Frank Weaver to prepare plans and specifications for paving of six streets, Main St. \$28,563, South Monument Ave., Wilson St. and Ludlow St., a total of \$7,500 and the Grand Blvd., \$11,000.

Hamilton, O.—Shuler Ave. is to be improved this summer by the installation of a sanitary sewer, curb and gutter and grading and graveling. Councilman Renner introduced a resolution directing the city engineer to prepare plans and specifications for this work. The portion of the streets to be improved lies between Lincoln and Cornell Aves.

Lima, O.—Petitions presented to county board of commissioners asking that two of the six miles of the Elida road be improved by paving.

Lisbon, O.—Supt. of Roads H. C. Armstrong preparing for three stretches of road improvement in Fairfield Twp., Columbiana-Leontonia Rd., the Columbiana-East Fairfield Rd. and the Columbiana-New Waterford Rd. Supt. hopes to have the roads ready for legislation by Jan. 15, so that the contracts will be ready to let in April.

New Concord, O.—Village plans a campaign to raise \$25,000 for boulevard from

the Baltimore & Ohio Railway station to the Muskingum College.

Upper Sandusky, O.—The county, with state aid, is making preparations to construct half a mile of waterbound pike on the road in Crawford Twp., that the State Automobile Association has designated as the official route between Columbus and Toledo.

Oklahoma City, Okla.—Resolution approving the city engineer's plans, specifications and estimates for the improving of 24th St. from the east line of Blackwelder Ave. to the west line of Classen Blvd. Grading, construct the necessary curb, gutter, manholes, catch-basins and inlets, drain pipes and lateral storm sewers, reset curb and otherwise improve.

Erie, Pa.—Street Director W. D. Kinney introduced to council ordinance providing for the paving of Liberty St. from 26th to 32d Sts., and Plum St. from 17th to 20th Sts.

New Castle, Pa.—Engineers are surveying and laying out the route of the state highway between Homewood and Wampum. The section is a part of the state highway extending from Morado Park at Beaver Falls to New Castle. When completed it will give a continuous roadway of brick and macadam through the Beaver Valley from the Ohio River to this city.

Seranton, Pa.—Ordinance authorizing the grading, paving and curbing of Columbia St. from Boulevard Ave. to Washington Ave.

Steelton, Pa.—Dauphin County road repairs ordered by Court.

Newport, R. I.—A resolution directing the city clerk to advertise for the supply of paving gravel was passed by the board of aldermen.

Woonsocket, R. I.—City to issue \$500,000 paving and bridge bonds.

Woonsocket, R. I.—Mayor Archambault's message to council suggests board of control or superintendent of public works to have charge of departments such as highways, sewers, and water.

Anderson, S. C.—Petitions asking the city council to order an election on the question of issuing \$125,000 of bonds for completing the street paving.

Darlington, S. C.—An election in near future to vote on the question of issuing paving bonds to the amount of \$50,000.

Spartanburg, S. C.—Spartanburg county plans bond issue of perhaps \$1,000,000 and not less than \$600,000 for building of improved roads before late spring.

Sumter, S. C.—The city clerk was authorized to prepare the necessary papers and to advertise for the sale of \$75,000 issue of paving bonds.

Cleveland, Tenn.—Bradley County voted \$25,000 for building pike roads. Bonds are to be sold April 1.

Dover, Tenn.—Election will be held March 1 to vote on the issuing road bonds for \$200,000.

Knoxville, Tenn.—City commission proposed for widening Clinch Ave., between Locust and Henley Sts.

Memphis, Tenn.—The Riverside Improvement Club, urging the commission to open Louisiana St. through to South Parkway.

Murfreesboro, Tenn.—The highway Commissioner has decided to spend \$500 for each mile on the Dixie Highway that runs through Rutherford county. Road machinery will be purchased and scientific work will be done.

Memphis, Tenn.—Representatives of the Memphis Real Estate Association have taken up the project of opening South 3d St. from Union Ave. to Rapburn Blvd. Twenty-one thousand dollars will be donated by property owners and other interested parties, toward financing the street extension. Experts are of the belief that to open the new roadway, to purchase certain property to be used for the highway, and for paving, the cost will run \$84,000.

Cherokee, Tex.—First National Bank of Jacksonville purchased Road District No. 1 bonds for \$200,000. C. F. Gibson, County Judge.

Dallas, Tex.—County Commissioners' Court passed the formal order for issuance of the \$500,000 good roads bonds which were voted upon favorably on Nov. 7, 1916. A tax levy of two and four-tenths cents on \$100 valuation was made in the order to care for the bond interest and retirement fund.

El Paso, Tex.—County Comrs. may call an election to vote \$400,000 bonds for good roads. They desire to complete

the gravel road being built from Fabens to the eastern county limits. Other road work to be undertaken is the repair and improvement of the El Paso-Ysleta Rd. The repair plan contemplates placing a concrete shoulder 3 ft. in width on each side of the road. All rough places would be removed and the road would then be treated with a bituminous binding guaranteed for five years.

Terrell, Tex.—The road commissioners of this district have decided to gravel the Terrell-Chisholm public road, which will make nine roads to be graveled.

Victoria, Tex.—City Council acted favorably on the petition of the property owners of the city as to the calling of an election to vote bonds in the sum of \$100,000 for street paving in co-operation with the adjoining property owners.

Wellington, Tex.—Road bonds for \$100,000 has been sold. A. C. Nicholson, County Judge.

Ogden, Utah.—City Commissioner Chris Flygare and City Engineer Joseph M. Tracy conferred with the county commissioners regarding the assistance which the county legally could give in the paving of Washington Ave. from 28th St. to the south city limits.

Salt Lake City, Utah.—Utah will share in the allotment of the annual million dollar fund provided in connection with the federal good roads law for roads and trails in national forests to the extent of \$41,167. Distribution will run for a period of five years. The apportionment of the home state takes average rank in comparison with the amounts given other commonwealths. Alaska receives \$46,354; Arizona, \$58,604; California, \$140,988; Colorado, \$62,575; Idaho, \$10,870; Montana, \$70,043; Nevada, \$19,296; New Mexico, \$42,495; Oregon, \$128,111; South Dakota, \$8,092; Washington, \$91,944; Wyoming, \$40,684. A total of \$9,995 has been allotted to Florida, Michigan, Minnesota, Nebraska, North Dakota and Oklahoma. E. R. Morgan, state road engineer, will recommend in his biennial report that the state road engineer, or the road commission, be given authority to spend Utah's share of the fund wherever improvements seem most needed, instead of dividing it equally among the twenty-eight counties.

Appalachia, Va.—Bids will be received for improving streets; \$80,000 will be expended. Address Street Comr.

Franklin, Va.—Citizens urge "Riage" route as part of the State's system of highways. Name committee to seek federal aid.

Norfolk, Va.—By approving a report from its good roads committee, the board of directors of the Chamber of Commerce decided to use its influence to have the United States War Department construct a military highway from the proposed fortifications at Cape Henry to Norfolk, thus connecting it with the navy yard, the marine barracks and its chief supply stations.

Norfolk, Va.—Matters adopted by the common council and concurred in by the board are the following, which now go to the mayor for his approval: Resolutions appropriating \$16,900 for widening and smooth paving Bank St.; approving the extension of Bank St. to Salter St.; appropriating \$4,875 for water mains in Bank St. prior to beginning work on Bank St.

Wise, Va.—Town plans to spend \$50,000 improving Main St. and others.

Davenport, Wash.—County Engineer G. G. Harvey is working with crew finishing survey of permanent highway No. 3 from Sprague to Harrington.

Everett, Wash.—Recent law suits the city have caused the council to consider the proposition of replacing all dangerous board walks with cement sidewalks.

Montesano, Wash.—County Engineer George D. Robertson recently received a copy of Deputy State Engineer H. W. Boetzke's report on proposed highway between Grays Harbor and Willapa Harbor. Road will be 7 miles long, cost about \$47,000.

Olympia, Wash.—Mayor Mills in his message to Council recommends repairs and improvements to streets.

Seattle, Wash.—Improvement of 37th Ave. S. from Genesee St. to Oregon St. by grading, adopted, and Jan. 23, 1917, set for hearing; 7th Ave., on the west side thereof, in front of lot 7 and the south 43 ft. of lot 3, in block 59, A. A. Denny's 5th addition, by concrete walks; street committee; E 41st St. et al., from 10th Ave. N. E. to 11th Ave. N. E., by

concrete walks, street committee; 50th Ave. S., et al., from Genesee St. to Brandon St., by constructing sewers, street committee.

Seattle, Wash.—Plans have been completed by County Engr. A. P. Denton and will be submitted to the State Highway Comm. for approval for the paving with brick of 3 miles of the highway from the Duwamish River to Renton Junction, estimated to cost \$100,000. Bids will not be called for until spring.

Seattle, Wash.—Plans and specifications approved: 24th Ave. N., asphalt paving, \$18,500. 1st Ave. N. E., concrete paving, \$7,600. 1st Ave. N. E., et al., concrete walks, \$4,600.

Spokane, Wash.—Plans and specifications for grading and sidewalking Nevada St. from Rowan to Euclid and Euclid from Nevada to Hamilton St. passed by city council. The estimated cost \$19,000. Bids will be advertised.

La Crosse, Wis.—Street and alleys committee of the council urge 30 blocks of additional brick paving for 1917 street program. Among the projects is provision for nine blocks of brick paving on West Ave. South, from Main to Jackson Sts. The largest is for six blocks on State St. from 12th St. to the Green Bay tracks. Two stretches of brick are proposed for North side streets. But two pieces of asphalt macadam, which has been the most favored paving heretofore were recommended. They are for four blocks on North State St. from State to La Crosse Sts., and Ferry St. from West Ave. to 13th St. The report recommends appropriation of \$700 for repairs on La Crosse St. in conjunction with the county, and \$100 for grading streets in the eastern section of the city.

Toronto, Ont.—The Caledonia Ratepayers' Association are urging the paving of St. Clair Ave., west from G. T. R. tracks to Keele St.

Moncton, N. B.—Main St., between the subways will likely be paved next summer. City Engineer, J. Edington.

Theodore, Sask.—The village council will borrow \$1,800 for grading and drainage work. Secretary, J. F. Baxter.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Berkeley, Cal.—City council, *W. J. Schmidt, Lincoln St., from the eastern line of Chestnut St. easterly a distance of 372 ft., be graded; concrete curbs and gutters be constructed; roadway be macadamized and surfaced with oil and rock screenings; concrete storm culvert; a 6-in. vitrified ironstone pipe sewer.

Glendale, Cal.—For constructing and paving with 5-in. concrete 30 ft. wide, 1.07 miles of Grand Ave., Road Dist. No. 116, by Bd. Supervisors, Los Angeles, to *Geo. H. Oswald, 405 O. T. Johnson Bldg., Los Angeles, at about \$11,000.

Washington, D. C.—Bids for furnishing 1,050,000 repressed vitrified paving blocks. Bidders: Baltimore Clay Products Co., Baltimore, Md., \$27 per mile; West Port Paving Brick Co., Baltimore, Md., \$26.50 per mile; Mack Mfg. Co., Philadelphia Bldg., Philadelphia, Pa., \$26.55 per mile; Thornton Tire Brick Co., Clarksburg, W. Va., \$27.95 per mile. Deputy Purchasing Officer, Washington, D. C.

Rock Island, Ill.—To construct the brick paving on 9th St. from 18th Ave. south to 52d Ave., or the Rock River bridge. The Tri-City Construction Co. was lowest and probably will be given the work. Excavation, 38½ cts.; curbing, 44 cts., and paving, \$2.09. McCarthy Improvement Co., excavation, 40 cts.; curbing 45 cts., paving, \$2.10. There are about 12,500 ft. in the job.

Anderson Ind.—The total cost of the construction of the ten roads that are to be built in Madison county in 1917 contracts for which were awarded by the board of commissioners, will be \$159,820, and bonds for that amount will be sold. The bonds will bear date of Feb. 7, 1917, and the first bond and coupon will be due May 15, 1918. Following is the amount of bonds that will be issued on each road: L. E. Baxter \$2,860; Jacob Fox, \$2,460; E. C. Clem, No. 1, \$3,200; E. C. Clem, No. 2, \$2,900; George Cunningham, \$8,300; Carlos S. Ravner, \$9,500; E. B. Schalk, Series A, \$23,600; E. B. Schalk, Series B, \$20,000; J. H. Glass, \$17,500; Charles Nick, Series A, \$25,000; Charles Nick, Series B, \$20,000; James Millsap, \$24,500; total, \$159,820.

Bloomfield, Ind.—For the construction of macadamized roads in Richland Twp., Greene County, to *Henry Warren and

Thos. Kindred, Bloomfield, Ind., for \$6,650. Washington Twp. roads went to Harrison Brown, Linton, Ind., for \$3,900.

Corydon, Ind.—Harrison county commissioners awarded the Heth and Washington township road to *Miller & Miller of Mauckport, Ind., for \$1,949.25.

Huntington, Ind.—County Comrs., on the Sutton and Beardsley-Rittenhouse roads, both improvements. The Sutton road is on the twp. line between Salamonie and Rock Creek Twp., and the Beardsley-Rittenhouse is in Rock Creek Twp. Beardsley-Rittenhouse Rd. were: *I. B. McAfee, \$9,787; Gordon & Brinneman, \$11,604; Elijah A. Auman, \$9,487; McAfee & Landis, \$8,776; and S. H. Palmer, \$10,440. Sutton Rd. were: *Gordon, Gordon & Brinneman, \$14,489; F. B. Fishbaugh, \$15,963; McAfee & Landis, \$16,409.60; S. H. Palmer, \$16,400.

Kokomo, Ind.—James Watson & Co., of Kokomo, Ind., will build a brick road for Howard county at a cost of \$17,991.

Storm Lake, Ia.—For grading portions of 72 miles of county highway system, as follows: John Leach, Washia, Ia., at 21.4 cts. per cu. yd.; Hanlon & Reilley, Omaha, Neb., at 24.4 cts. per cu. yd.; Geo. W. Condon, Omaha, Neb., at 24.5 cts. per cu. yd.

Mt. Clemens, Mich.—For road work as follows: 8 miles stone base with gravel top to *W. B. Hutchinson, Michigan City, Ind.; 3 miles gravel road to *Cairns, Kendrick & Bruel, Mt. Clemens. Comrs. of Macomb county, W. J. Lehner, Engr.; W. Rosso, Chmn.

Iberia, Mo.—J. T. Code, Springfield, Mo., for constructing highway 2½ miles long, between here and Crocker, by county comrs., Tuscumbia.

Butte, Mont.—City council, bitulithic pavement for Montana St., to *J. C. McGuire, including gutters, curbs, pipe, catch basins and manholes, being \$81,556.33. Bid covered the following specifications: 26,856.14 sq. yds. of bitulithic paving at \$2.70 per sq. yd.; 7,066 lin. ft. of plain gutter at 50c per ft.; 300 lin. ft. of combination curb and gutter at 85c per ft.; 4,165 lin. ft. of cement or vitrified pipe, 95c per ft.; 20 concrete catch basins, \$35 each; 12 concrete manholes, at \$50 each.

West New York, N. J.—Paving and improving streets as follows: Portions of 15th St., to *Michael Henry, 212 17th St.; 22d St. to *Robert Emmer, 150 Nesbit St.; Weehawken, N. J. Town council, Chas. F. Henry, Clk.

Winston-Salem, N. C.—Street committee, Mayor Eaton, for the pavement of the approaches to the new union passenger station, *C. M. Thomas & Co., of this city. Bids submitted included both No. 1 granite block and durax granite block, both carrying concrete base. The city officials decided to use the durax block, this presenting the lowest cost, and being recognized as one of the standard permanent paving materials.

Caldwell, O.—To *Greene & Getman, Kent, O., grading and macadamizing .73 mile reinforced concrete, \$18,336; Sec. H. Caldwell-Campbell road, Noble township. Engr., John T. Watson, Court House, Caldwell, Noble county, C. C. Johns, Aud., Court House, Caldwell, and State Highway Dept., Clinton Cowen, Comr., Hartman Bldg., Columbus, O.

Marion, O.—*O. J. Noble, for 10,125 sq. ft. sandstone sidewalks in Oak St., Merchant Ave. and Bennett St. H. A. Stevens, City Clk.; Ed. S. Ault, Engr., Masonic Bldg.

New Concord, O.—For paving 5 miles village streets. Brick, 11,579 sq. yds., including concrete foundation, 5-ins. thick. Bidders: *Adams Bros. Const. Co., Zanesville, O., paving, \$2.14 per sq. yd.; excavation, 50 cts. per cu. yd.; total, \$34,850.43; Geo. H. Heffner & Son, Celina, O., paving, \$2.16 per sq. yd.; excavation, 46 cts. per cu. yd.; total, \$36,795.34. W. C. Trace, village clerk.

Coatesville, Pa.—*James McGraw Co., Commercial Trust Bldg., Philadelphia, grading, south of Valley, near Coatesville. Engr., Samuel T. Wagner, care Philadelphia & Reading R. R. Co.; A. T. Dice, Pres., Reading Terminal, Philadelphia, grading and masonry.

Ogden, Utah.—*Utah Construction Co., Union Pacific R. R. Co., accepted the bid of this company for two pieces of grading work on its Wyoming division. Covers the construction of additional second track between Wamsutter and Point of Rocks, a distance of a fraction less than 52 miles. Including in this is a line change between Tipton and Bitter Creek, between which two pieces the new line is at some distance from the

present operated track. The other piece of work is between Buford and Hermosa, Wyo., and includes the boring of a new tunnel, paralleling the present one, through Sherman hill. The length of this is approximately 1,800 ft.

Seattle, Wash.—County commissioners, for the grading, etc., of 3 miles of highway between Lake Burien and Three Tree Point resulted as follows: Henry Brice, 209 Mutual Life Bldg., \$28,331; E. Mattson & Son, \$28,393; G. A. Banderett, Renton, Wash., \$28,400; W. W. Wilcox, \$28,395; M. P. Zindorf, \$28,947; R. E. Russell, \$29,400; Hans Pederson, \$29,970; Sloane Bros., P. O. Box 348, Seattle, Wash., \$30,032; E. J. McQuaid, \$30,210.60; P. J. McHugh, \$31,500; D. J. McLean, \$33,102.38; S. Normile, No. York Bldg., Seattle, Wash., \$36,919.60. Taken under advisement for one week. Work involves 45,000 cu. yds. excavation, 200 ft. frame trestle and a long creosoted timber and pile bulkhead.

Seattle, Wash.—Thirty-seventh Ave. S., grading and curbing, Ord. 3684. *Andrew Peterson, 223 Pioneer Building, \$2,249.

SEWERAGE

Brawley, Cal.—City soon to let contract pipe line, concrete basin, high pressure line, etc. About \$17,000.

Seal Beach, Cal.—The election was successful for \$40,000 sewerage bonds.

Monticello, Fla.—Council was instructed to call an election for the purpose of voting for bonds for sewerage to the extent of some \$23,000.

Tallahassee, Fla.—Spitzer, Rorick & Co., of Toledo, O., purchased Everglades drainage bonds in the sum of \$3,500,000.

Findlay, Ia.—\$35,000 in bonds have been voted for sewer system. Address Village Clerk.

Waterloo, Ia.—Mayor W. R. Law received a communication from E. B. Rees, Denver, Colo., offering to take over the disposal of all garbage in the city provided he be granted the exclusive contract. He agrees to remove the garbage without cost to the city. The proposition will be considered along with other plans that may be presented during the next two or three months.

Boston, Mass.—Pilgrim Tercentenary Commission for permanent memorials at Plymouth presents plans calling for an aggregate expenditure of \$1,884,300. This includes \$300,000 for taking land and building on the water front, \$500,000 for a sea wall, with stairway and ornamental railings and a new stone pier, \$33,000 for a canopy over the rock, \$75,000 for land on Cole's Hill, \$600,000 for a memorial hall, \$30,000 for roads, grading and planting, etc.

Escanaba, Mich.—Council voted to authorize the Bd. of Pub. Works to purchase the necessary machinery for installation at the sewage disposal plant. The type of machinery ordered was endorsed by T. C. Hatton, sanitary engr. for the city of Milwaukee; will be installed at a cost of \$4,000. Specifications for the construction of three sewers that will empty into the trunk line from the North Escanaba district. The Cochran district sewer will cost \$5,945. The Stephenson district sewer will cost \$14,843.50, and the Wells district sewer will cost \$11,442.

Lansing, Mich.—Petition for a sewer for Franklin Heights subdivision referred to the committee on sewers.

Muskegon Heights, Mich.—Ann Arbor engineers designing plans for a sewer system to be installed in this city, who originally placed their estimate at \$150,000 as the cost of constructing have cut their original figure \$50,000.

Duluth, Minn.—City council ordered a storm sewer and catch basin in Ninth Ave. and Eighth alley, the estimated cost being \$118.

Winona, Minn.—Council proposes during the coming summer to complete the West Fifth St. storm sewer, the Olmsted St. sewer from Fifth St. to the river, the paving on Huff from Second to the lake, and Mankato Ave. from Broadway to the Milwaukee tracks, and to pave Fifth from Mechanic to Olmsted and Third St. from Washington to Olmsted.

Carthage, Mo.—City Surveyor Frank Newton submitted to the city council plans, specifications and estimates for a lateral sanitary sewer in district No. 54 in the east part of town. The territory included is of rectangular form, with its northern boundary 100 ft. north of Seventh St. and its southern boundary 100 ft. south of Chestnut St. Its western

boundary is 100 ft. west of Clinton St. and its eastern boundary 300 ft. east of Valley St. The total cost, is estimated at \$6,179.50, which would be at the rate of \$7 for each 1,000 ft. of area included in the district.

Omaha, Neb.—Ordinances providing for the sale of \$100,000 intersection and \$200,000 sewer bonds have been prepared to be presented to council.

Bayonne, N. J.—Ordinance to construct a sewer in W. 10th St. from a point about 355 ft. west of Ave. C, easterly to connect with present sewer in said Ave. C, vitrified pipe.

Hightstown, N. J.—Borough council considering extension of the water and sewage system.

Longport, N. J.—City Commissioners are preparing to readvertise for bids under revised specifications for Longport's sea wall, a massive barricade of reinforced concrete, which is expected to restore confidence of investors in sea-front property.

Brooklyn, N. Y.—The board of estimate authorized sewer improvements to cost \$862,900. Storm water sewer in Ocean Ave. from Ave. O to Sheepshead Bay, \$760,000; sanitary sewer on the westerly side of Ocean Ave. from Ave. S to Ave. J, \$2,000; sanitary sewer on the westerly side of Ocean Ave. from Ave. Q to Ave. R, \$1,900; sewers in Kings Highway from East 19th St. to Ocean Ave., \$1,500; sewers in East 18th St. from Ave. O to Ave. R; in East 19th St. from Ave. O to Ave. U; in Kings Highway from East 17th St. to East 18th St.; in Ave. P from East 17th St. to Ocean Ave.; in Ave. Q from East 18th St. to Ocean Ave.; in Ave. R from East 18th St. to Ocean Ave.; in Ave. S from East 19th St. to Ocean Ave.; in Ave. J from East 10th St. to Ocean Ave., and in Ave. U from East 17th St. to Ocean Ave.; estimated cost, \$96,000; sewers in East 18th St. to East 19th St., \$1,500.

Niagara Falls, N. Y.—City council votes \$192,000 bond issue for the following sewers: Tunnel in Second St. from the present trunk tunnel in Niagara St. to a point about 20 ft. north of the south line of Falls St.; a sewer across the lands of the Niagara Falls Power Co. from Royal Ave. to Buffalo Ave., and in Buffalo Ave. from Iroquois St. to Union St.; an open ditch across the lands of the Niagara Falls Power Co., along the east line of Union St. extended northerly from Royal Ave. to Pike Creek; a sewer in 24th St. from Ferry Ave. to La Salle Ave.; sewer in 15th St. from Calumet St. to Center Ave. and a sewer in Center Ave. from 15th St. westerly for a distance of 525 ft.

Ogdensburg, N. Y.—Present council will be confronted by numerous important propositions, motorizing at least part of the fire department, purchase of a triple combination fire truck, operated by gasoline, new fire station, new city jail and a public market, purchase of site and erection of building.

Olean, N. Y.—Mayor Studholme in his message recommends advertising for bids to build storm water and sanitary sewers on West State St.

Oswego, N. Y.—Department of works proposes to order the following local improvements: Construction of vitrified tile sewer in the following streets: Judson St., Oneida to Bridge St.; East Van Buren, 11th to 12th St.; Arabel St., Schuyler to Van Buren St.; East Second St., Albany to Division St.; Bronson St., Ontario to Liberty St.; Dorcas St., Van Buren to Bronson St.; Ontario St., Van Buren to Bronson St.; Erie St., Fifth to Ninth St.; Niagara St., Seventh to Ninth St.

Yonkers, N. Y.—Resolution directing the City Engr. to prepare plans and specifications for the construction of a sewer in Kenneth Ave., from Lockwood Ave. northerly. Approved.

Yonkers, N. Y.—Resolution directing the Comr. of Public Works to have a catch basin constructed on the east side of Sevmour St., at Franklin St. Approved.

Yonkers, N. Y.—Resolution directing the city engineer to prepare plans and specifications for the construction of a sewer in Tuckahoe Rd. from the Bronx Valley sewer westerly. Approved.

Yonkers, N. Y.—Committee on public works, submitting an ordinance authorizing the commissioner of public works to have constructed certain catch-basins, manhole heads and culverts in North Broadway, without first obtaining competitive proposals. Adopted on ordinance.

Bowling Green, O.—City to issue \$1.

800 bonds for the additional cost of the construction of S. Summit St. sanitary sewer from Prospect St. to Gould St.

Canton, O.—The construction of the central southwest sanitary sewer to care for a big district between 9th St. S. W. and the Pennsylvania Railroad, at a cost of \$76,756, was adopted by council on the adoption of a favorable report of the finance committee.

Canton, O.—A favorable report was made by the sewer committee on the construction of a sewer in 8th St. N. E. from Beldon Ave. N. E. to the corporation line, and plans will be drafted and the cost secured.

Canton, O.—Ordinance to proceed with the construction of a sanitary sewer in Clyde Pl. S. W. from Smith Ave. S. W. to Dartmouth Ave. S. W.

Canton, O.—Ordinance to proceed with the construction of a sanitary sewer in Bedford Ave. N. W. from Tuscarawas St. W. to Fourth St. N. W. Henry A. Schrantz, Pres. of the Council; W. Edgar Jackson, Clerk of Council; Charles A. Stolberg, Mayor.

Hamilton, O.—See "Streets and Roads." **Hamilton, O.**—For the construction of a sewer on Charlton Ave., consisting of 8 or 10-in. vitrified tile pipe, tenders will be called shortly. City Engineer, E. R. Gray, City.

Leetonia, O.—Sewage disposal plant bonds for \$28,000 have been sold to the State Industrial Commission at par. J. S. McCue, Village Clerk.

Oklahoma City, Okla.—See Streets and Roads.

Portland, Ore.—Bids rejected for the construction of the Tanner Creek sewer.

Erie, Pa.—Mayor Miles B. Kitts expects to confer in Harrisburg with Dr. S. G. Dixon, state health commissioner, on preparation of plans for the sewage treatment experimental station here, the plans to be ready by March 1 and the temporary plant in operation by June 1. Street Director, W. D. Kinney asking data on construction and operation of sewage treatment plants in those cities.

Erie, Pa.—Resolutions adopted calling for bids on a 12-in. sanitary sewer in 30th St. from Wood Road to Perry St., south in Perry St. to 31st and west in 31st St. 550 ft.; also for sewers in 31st St. from Cascade St. 550 ft. east and from Plum St. 250 ft. east, and in 30th St. from Plum St. 500 ft. west and 230 ft. east.

Beaumont, Tex.—City council agreed to grant the South Park school a permit to connect with the city water and sewer mains.

Houston, Tex.—The following city bonds aggregating \$1,235,000: Sanitary

sewage disposal, 5%, s. o. 30 1-6 years (average), \$50,000; sanitary sewage disposal, 5%, s. a. 5-40-year (serial), \$360,000; wharf, 4½%, s. a. 8-40-year (serial), \$825,000. A syndicate, composed of Messrs. Estabrook & Co., E. H. Rollins & Sons and the Harris Trust & Savings Bank of Chicago, was the successful bidder. Bidders were: Stack & Braun, Baker, Watts & Co., Commerce Trust Co., Kansas City, and Yard, Otis & Taylor, jointly, 103.43; H. A. Kahler & Co., Bolger, Mosser & Willaman, and Mercantile Trust Co., jointly, 103.41; Weil, Roth & Co., Seasongood & Mayer, Whitman & Co., and Hagan, Walker & Co., jointly, 102.89. Ben Campbell, Mayor.

Milwaukee, Wis.—About the middle of next month a contract for an open sewer from Clinton and Becher St. to First and Cleveland Aves will be let.

Milwaukee, Wis.—Bids on a 48-in. intercepting sewer, 2½ miles long, running from Clinton and Lapham to Superior and Rusk, and on a 51-in. sewer on 40th St. from the Watertown plank road to Chestnut Sts. will be opened in February.

Harrison, Ont.—The by-law to complete the new town hall and municipal building was carried by the ratepayers. A. J. Stewart, Clerk.

Ottawa, Ont.—The ratepayers voted \$50,000 for a civic garbage collection plant and \$75,000 for public swimming baths. Norman H. Lett, City Clerk.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Salem, Ill.—Foulkes Contracting Co., 513 Terre Haute Trust Bldg., Terre Haute, Ind., sewer and sewage disposal plant, \$50,000. Engr., Caldwell Engr. Co., Avers Natl. Bank, Jacksonville, Ill.; Frank Schwartz, Mayor; J. C. Whitson, City Clerk, Salem.

Mishawaka, Ind.—Board of Public Works, for constructing a lateral sewer on 13th St. from Spring to West Sts., *Reesh & Carter. Other bid: Midland Company, of South Bend.

Red Lake Falls, Minn.—For sewers in Red Lake Falls, *P. McDonnell, 205 Sellwood Bldg., Duluth, Minn. Jos. Perrault, City Clerk, Red Lake Falls; J. A. Wallace, Engr., Crookston, Minn.

Yonkers, N. Y.—For constructing a house and storm-water sewer in Lake Ave., *Joseph Cuzzo; \$10,414.60.

Columbia, O.—Director of Public Service George A. Borden. Following bidders for constructing a sewer in Kelton Ave., from Main St. to the alley south; Edmond W. Beasley, \$3,562.70; I. O. Jones, \$4,058.95; Geo. F. Ames & Co., \$3,506.50.

Hamilton, O.—The contract for the sanitary sewer system in the Lindenwald district will be awarded to the John L. Walker Co. at its bid of \$52,865, which was \$3,703.20 lower than the next bid.

Ironton, O.—*Fred B. Davies, at \$2,000, for 1,636 ft. No. 1 pipe sanitary sewer; city council, F. A. Ross, Clk.; Leonard Howell, City Engr.

Marion, O.—For sanitary sewers as follows: 2,000 lin. ft. 8 and 10-in. sewer, brick manholes and catch basins in Toledo Ave., to *Kohbarger & Hoyle, at \$2,091; 2,536 lin. ft. 12 and 18-in. sewer, with necessary catch basins, in Hartford St., and 1,200 lin. ft. 15-in. in State St., to *Geo. Landon & Son, at \$2,405 and \$573. City Council, H. A. Stevens, Clk., Masonic Bldg.; Ed. S. Ault, City Engr., Masonic Bldg.

Nanticoke, Pa.—*G. W. Rockwell, for 1,200 lin. ft. 24-in. terra cotta pipe storm sewer in Hanover by Borough Council, Robt. M. Smith, Pres.; A. S. Jacobs, Secy.

San Antonio, Tex.—For the construction of the Collins Garden sewer: *Elder Brothers was lowest by \$220.

Salt Lake City, Utah.—A difference of \$68,418 separates the high and low bids for the construction of the proposed city outlet sewer, opened by the city commission; three bidders and the preliminary estimate placed the cost of the work at \$100,000. Bids are as follows: Gibbons & Reed, reinforced concrete, 250 days, \$159,704; P. J. Moran, 156 W. Second South St., Box 783, reinforced concrete, \$136,946.80; monolithic pipe, \$114,739.80, 225 days; J. W. Mellen, reinforced concrete, \$98,482; monolithic pipe, \$91,386; 180 days.

Huntington, W. Va.—For sewer laterals as follows: In First alley from Monroe Ave. to alley between Jackson and Van Buren Ave., and in Beechville addition to *Jack Ullom, 1723 11th Ave., 900 ft., 10-in. tile sewer in Claremont Ave. and 975 ft. 12-in. in Caldwell and Rural Aves. to *Stander Const. Co., 302 Sixth St., at \$900 and \$2,280. Dept. of Streets, O. G. Wells, Comr., City Hall; A. B. Maupin, City Engr., City Hall.

Milwaukee, Wis.—Contracts amounting to \$1,670,000 will be awarded by the sewerage commission by the middle of next month, according to T. C. Hatton, chief engineer of the commission. Bids on the first of these, a 6-ft. tunnel sewer, from Eighth and Clybourn to 40th, and the Watertown Plank road, to O'Brien & Jackson, for \$378,840.22. Five other bids were received, the highest being \$570,250. This sewer will be 13,500 ft.

Allentown, Pa.—Bids received by C. D. Weirbach, city engineer, for storm sewer construction.

SECTION 5.

		Oak and Howard Relief Sewer Via Hazel St				Schaeffer & Ackerman,*		Weaver Contracting Co.,		Frank Cannon,	
		McInerney & James Ferry & Co., Inc., At-		Allentown, Pa.		Allentown, Pa.		Allentown, Pa.		Allentown, Pa.	
		Easton, Pa.		Atlantic City, N. J.		Allentown, Pa.		Allentown, Pa.		Allentown, Pa.	
		Unit.	Total.	Unit.	Total.	Unit.	Total.	Unit.	Total.	Unit.	Total.
Junction connections to present sewer											
of Howard St. at Chew St.....		\$300.00	\$300.00	\$150.00	\$150.00	\$200.00	\$200.00	\$400.00	\$400.00	\$200.00	\$200.00
A 670 lin ft. 36" cir. mon. con. sewer.....				8.50	5,695.00	4.40	2,948.00	4.90	3,283.00	11.40	7,638.00
B Rein. con. pipe sewer.....		1.1. 7.43	4,978.10	c.j. 8.50	5,695.00	1.1. 4.40	2,948.00	1.1. 5.60	3,752.00	1.1. 11.45	7,671.50
				1.1. 8.50				p.u. 5.60			
C Segmental block sewer.....				A 8.50	5,695.00	p.s. 4.65	3,115.50	p.s. 5.25	3,517.50		
A 150 lin. ft. 40x60" egg-shaped mon. concrete sewer.....				12.90	1,935.00	6.80	1,020.00	8.00	1,200.00	16.00	2,400.00
B 48" cir. rein. con. pipe sewer.....		1.1. 10.96	1,644.00	c.j. 12.90	1,935.00	1.1. 6.80	1,020.00	1.1. 8.25	1,237.50	1.1. 15.50	2,325.00
				1.1. 12.90				p.u. 8.25			
C 40x60" cir. rein. con. pipe sewer.....				A 12.90	1,935.00	p.s. 6.95	1,042.50	p.s. 8.00	1,200.00		
4 cir. standard brick manholes.....		85.00	340.00	65.00	260.00	90.00	360.00	50.00	200.00	65.00	260.00
1 30" "D" inlet.....		140.00	140.00	90.00	90.00	95.00	95.00	90.00	90.00	80.00	80.00
100 cu. yds. rock excavation.....		2.50	250.00	3.00	300.00	2.50	250.00	2.00	200.00	3.00	300.00
Extra earth excavation.....		.75		.75		.75		.75		.75	
Total A.....					8,430.00		4,873.00*		5,373.00		10,878.00
Total B.....			7,652.10		8,430.00		4,873.00		5,879.50		10,836.50
Total C.....					8,430.00		5,063.00		5,607.50		

Alternate proposal via Fountain St.:

Junction connecting to present sewer										
of Howard St. at Chew St.....	\$300.00	\$300.00	\$150.00	\$150.00	\$200.00	\$200.00	\$400.00	\$400.00	\$200.00	\$200.00
1,000 lin. ft. of 36" cir. mon. con. sew.			6.75	6,750.00	4.40	4,400.00	4.90	4,900.00	12.00	12,000.00
Reinforced concrete pipe sewer.....	1.1. 10.56	10,560.00	c.j. 6.75	6,750.00	1.1. 4.40	4,400.00	1.1. 5.60	5,600.00	1.1. 12.50	12,500.00
			1.1. 6.75				p.u. 5.60			
Segmental block sewer.....			A 6.75	6,750.00	p.s. 4.65	4,650.00	p.s. 4.90	4,900.00		
4 cir. standard brick manholes.....	125.00	500.00	65.00	260.00	90.00	360.00	50.00	200.00	116.00	440.00
1 30" "D" inlets.....	150.00	150.00	90.00	90.00	95.00	95.00	90.00	90.00	80.00	80.00
2 30" "E" inlets.....	150.00	300.00	90.00	180.00	100.00	200.00	90.00	180.00	75.00	150.00
300 cu. yds. rock excavation.....	2.50	750.00	2.50	750.00	2.50	750.00	2.00	600.00	3.00	900.00
Extra earth excavation.....	.75		.75		1.75		.75		.75	
1:2:4 concrete (including forms).....	10.00		9.00		6.80		7.00		9.00	
Total A				8,180.00		6,005.00		6,370.00		13,770.00
Total B		12,560.00		8,180.00		6,005.00		7,070.00		14,270.00
Total C				8,180.00		6,225.00		6,370.00		
% of reduction for whole contract.....	6.0%				2%					

*Awarded contract on monolithic concrete sewer. A—Amaco segment sewer block; c.j.—Core joint reinforced concrete pipe; 1.1.—Lock joint concrete pipe; p.s.—Parmley segmental construction; p.u.—Parmley reinforced concrete pipe.

long, and in some places will go down to a depth of 70 ft.

WATER SUPPLY

Talladega, Ala.—Water works bonds of \$200,000 contemplated by city.

Seal Beach, Cal.—The election was successful for \$35,000 bonds for water system.

Bethel, Conn.—Borough approved new filter plant, voted to procure the services of an expert engineer at a cost not to exceed \$250, to come and investigate the plans and specifications of the committee and to advise regarding the working out of the proposed plans.

Washington, D. C.—Extension of the benefits of Washington's \$20,000,000 water system to nearby Maryland communities was discussed between district officials and representatives of the Washington Suburban Sanitary Comm., headed by W. T. S. Curtis, chmn. The comm. presented to Engr. Comr. Kutz a draft of a proposed bill. It was decided by the local officials that the measure was not sufficiently specific in detail to meet certain conditions, with the result that Assistant Engr. Comr. Powell was instructed to draft a measure which would meet the Comr.'s views in this respect.

Pocatello, Ida.—Resolution adopted instructing the water supt. to investigate the securing of a 25-ft. right of way for the pipe line from Mink Creek to Gibson Jack.

Barry, Ill.—Water works bonds, \$17,000, purchased; Messrs. R. M. Grant & Co., of Chicago, at \$103.539, a basis of 4.55 per cent.

Springfield, Ill.—Construction of two new trunk line water mains considered by city council; specifications approved calling for bids for 1,250 tons of water pipe.

Forest City, Ia.—Forest City has voted to issue \$15,000 in bonds to improve water system. Address C. B. Chryst, City Clerk.

Shreveport, La.—Finance Commissioner Robert W. Ward signed a contract for new boilers for the Shreveport water works pumping station which will cost \$6,400. The syphon intake will also have to be lowered and this will cost a couple of thousand dollars. Within the year Commissioner Ward says that two new pumps will have to be purchased at an expense of \$8,000.

Concordia, Kans.—An ordinance authorizing the issuance of \$12,700 water works bonds was passed. Several bids, offering premiums, were read. Awarded to the Wright Investment Co., of Kansas City, a premium of \$410 for the issue.

La Crosse, Kan.—Town voted \$140,000 for a waterworks system.

Munden, Kan.—The election for issuing electric light and water bonds, \$20,000, successful. W. G. Strand, City Clk.

Sherborn, Mass.—New water works system Engineer Charles M. Taylor, of Wellesley, is to prepare an estimate on the cost.

Spencer, Mass.—The water commissioners asked the legislature to grant them the right to issue \$75,000 of bonds to reconstruct the water main from Shaw Pond, the town water supply to the point where the pipe ends, at the intersection of Main and Spring Sts.

Helena, Mont.—Messrs. Elston & Co. of Chicago were the successful bidders refunding water series "J" bonds to the amount of \$250,000. Martin Doty, City Clerk.

Boonton, N. J.—City Comrs. plan filter plant. J. D. Dean, Supt.

Hightstown, N. J.—See "Sewerage."

Perth Amboy, N. J.—Water works improvements are proposed by Water Comrs.

Albany, N. Y.—Board of Estimate directed that bids be delivered for furnishing c. i. pipe for the water bureau.

Rochester, N. Y.—Hallgarten & Co., New York City, successful bidders for \$685,000 waterworks improvement and \$140,000 incinerator bonds.

Yonkers, N. Y.—Bd. of Contract & Supply rejected the bid of the Epping Carpenter Pump Co., the only bidder on the purchase of a 3,000,000-gal. pump for the tube well pumping station. City Engr. Daniel Fulton pointed out that the specifications called for a pump capable of 125,000,000 foot-pounds, whereas the pump that the company plans to furnish can give only 100,000,000 foot-pounds. The company wants a bonus above the contract price for every million foot-pounds over 100,000,000. The bid, \$28,700, is some \$7,000 higher than

the bids in 1912 for a 10-million-gal. pump.

Yonkers, N. Y.—Ordinance adopted directing the Comr. of Public Works to lay a main in some street or right of way at Cedar Knolls, from Beechmont Ave. to Cedar Lane, a distance of 600 ft.

Yonkers, N. Y.—Public Works Comr. Brady recommending that the water works system be extended by the laying of a main in Gramatan Trail for a distance of 700 ft., and in Washington Rd. a distance of 800 ft., on the understanding that the owners of adjoining property pay the cost of trenching and refilling. Adopted ordinance.

Asheville, N. C.—Comrs. ordered the installation of 3-in. water line on Coleman Ave. west of Conestee St.

Hickory, N. C.—The city will improve water works. They will install two 250-gal. centrifugal electrically-operated pumps, also a filter. Address J. W. Bailen, City Manager.

Canton, O.—City council passed ordinance to issue \$45,000 bonds to buy north end reservoir site.

Canton, O.—Ordinance authorizing the Director of Public Service to advertise and receive bids and enter into a contract for the purchase and erection of a pump for use in the water works department at a cost of not to exceed \$4,000.

Gate, Okla.—The city contemplates voting on bonds to construct water works. The mayor.

Checotah, Okla.—The city will expend \$20,000 to extend water works. Address A. O. Johnson, Engr.

Warrenton, Ore.—Water Comn. plans water mains in several streets.

Ben Avon Heights, Pa.—State public service commission has approved the application of this place for permission to take over the Frazer water plant.

Ringtown, Pa.—A decision was handed down by Comr. James Alcorn, of the Public Service Commission, at Harrisburg, granting the Borough of Ringtown the right to construct water works.

Smoaks, S. C.—Water works bonds, \$3,000, purchased by Messrs. G. B. Sawyers & Co., of Columbia.

Beaumont, Tex.—Bids will be advertised for fire hydrants and other equipments for the water works.

Beaumont, Tex.—See "Sewerage."

Olympia, Wash.—W. J. Roberts, state highway engineer, filed a recommendation with council urging that proposed filtration plant for water system be built at once. Cost, \$2,562.

Seattle, Wash.—Ordinance introduced provides for condemnation of certain lands around Swan Lake for storage reservoir and for a right of way and reservoir site in W. Seattle. Finance and city utilities committees.

Chilton, Wis.—City receiving bids, water system. J. Donahue, Sheboygan, Engineer.

Kamloops, B. C.—For the use and storage of water out of Guichon Creek, Jas. C. Shields of this city plans to construct dams and reservoirs.

Vancouver, B. C.—Five tenders for supplying water meters to the city were opened by the civic water committee and referred to the City Engr. for tabulation.

Victoria, B. C.—The municipal budget of the city of Victoria for 1917 calls for an expenditure of \$1,799,695, including \$246,769 for the water works department and \$291,320 for water works.

Cayuga, Ont.—Council will soon receive bids on water mains, pumps, gas engines, steel tanks, etc. Jackson & Lee, Temple Bldg., Brantford, Engrs.

Markham, Ont.—Ratepayers passed a by-law to extend the waterworks system at a cost up to \$6,000. Clerk, M. White.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Hartford, Conn.—*Chapman Mfg. Co., Indian Orchard, Mass., for furnishing bronze fittings and appurtenances for the water department. Bids opened Dec. 29. Total, \$2,918.

Rock Island, Ill.—*P. F. Trenkenschuh, for the construction of water mains on 42d Ave. from 14th St. east to 15th St. Figures as follows: 609 ft. 8-in. water pipe, \$1,096.20; 30 ft. 6-in. pipe, \$33; two fire hydrants, \$112; two auxiliary valves, \$60; 18-in. valves, \$45; specials, per pound, 5 3/4 cts.

Lake Mills, Ia.—*Peterson & Iverson, Lake Mills, at \$25,000, for water works, by city council. T. J. Severson, City Clk.; Lake Mills; The Hawkeye Supply Co., Engrs., Mason City, Ia.

Duluth, Minn.—For 36-in. water main from reservoir on Fourth St. to Parkside Ave., down Parkside Ave. to First St., to *Simon Johnson, 818 E. Third St., at \$11,377.50. W. H. Borgen, City Clk.

St. Paul, Minn.—Council approves the purchasing committee to the *St. Paul Builders Material Co. for furnishing 30,000 barrels of Portland cement to the water department at a price of \$2.23 per barrel, or a total contract price of \$66,900.

Bozeman, Mont.—*Monarch Const. Co., of Bozeman, for constructing new reservoir near intake on Bozeman Creek and 2 miles of pipe line, on their bid of \$27,781.85. Other bidders were W. L. Geist, St. Maries, Ida., \$32,142.75; Security Bridge Co., Billings, \$30,474.50; Lindstrom & Oren, Billings, \$32,065.50, and McLaughlin & O'Neil, Livingston, \$28,456.45.

Binghamton, N. Y.—*A. B. Rover, for the big motor and centrifugal pump at the First Ward Dike. The pump will care for the water which collects back of the dike, will be of high power and will cost \$1,387.

Lorain, O.—*Baker, Dunbar, Allen Co. of Cleveland, \$10,000; installing a new pump at the Lorain waterworks.

Philadelphia, Pa.—For 24 and 18-in. c. i. pipe line from reservoir to Marcus Hook, for concrete reservoir, backfilling, excavating, etc. New Chester Water Co., A. W. MacCallum, secy. and gen. mgr., 26 S. Third St.; *James Hanna & Sons, Chester, Pa.

Beaumont, Tex.—South Park school board, for the construction of the water mains, which will connect the city mains with the suburban school: *Houston Construction Co., whose bid was \$3,500, secured the contract. The pipe was ordered from the American Cast Iron Co., of Birmingham, Ala. Bids on the construction of sewer mains to connect with the city's are now being advertised for.

MISCELLANEOUS.

Tuscaloosa, Ala.—An election will be held in the near future to vote on the question of issuing municipal wharf bonds to the amount of \$50,000.

Berkeley, Cal.—See "Water Supply."

Pomona, Cal.—A resolution passed by the Board of County Supvrs.; County Highway Comr. Joyner is now at work on an estimate which will provide for the abolishment of three railroad grade crossings on the Pomona Valley Blvd. west of this city.

New Haven, Conn.—Board of Alder-Washington, D. C. (Bureau of Foreign and Domestic Commerce, Dept. of Commerce).—A firm in Norway desires to secure an agency for the sale of electric heating appliances, such as ranges, toasters, etc. Catalogues should be sent. Correspondence may be in English. Reference. Refer to Opportunity 23459.

Washington, D. C.—See "Streets and Roads."

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce).—A firm in Chile wishes to secure an agency for the sale of motor truck chassis, with a four-wheel drive. Quotations should be made f. o. b. New York. Cash will be paid. Correspondence may be in English. References. Refer to Opportunity No. 23472.

Washington, D. C.—A petition, signed by citizens of Takoma Park, requesting the Commissioners of the District to place a swimming pool in their neighborhood, was forwarded to Commissioner Oliver P. Newman, through the office of the department of playgrounds. The petition designates as a possible location for a pool square 3185, which contains 16,898 sq. ft., at the junction of Chestnut St. with Spring Rd.

Benton, Ill.—The proposition to issue funding bonds to the amount of \$19,000 was defeated. D. E. Burgess, City Clk.

Joliet, Ill.—Joliet Association of Commerce has been requested to join with other cities in a national movement for public comfort stations. It is reported by the organization that more than 300 municipalities are considering this step and that more than fifty cities are making a practical start toward the establishment of these necessities. Chicago is cited as one of the cities taking the lead in this direction. A complete survey of the city was made and the Council has adopted a resolution authorizing a vote of a \$500,000 bond issue, the money to be used in erecting 33 stations in various parts of the city.

Lockport, Ill.—Comms. of Highway au-

thorized the purchase of an Austin Western road oiler, for use in oiling roads in the twp. The new machine will be delivered in May.

Evansville, Ind.—Mayor Benjamin Bosse's annual message to Council recommends two comfort stations on Third and Main Sts.

Huntington, Ind.—On advice of Chief of Police Baker, the Board decided to ask the Council to transfer \$400 from the appropriation for additional patrolmen to buy a small motor patrol wagon.

Indianapolis, Ind.—Ordinance authorizing the city controller to negotiate a loan in the sum of \$300,000; passed.

Warsaw, Ind.—Bids received Jan. 22, 1917, at 2 p. m., by city clerk for sale \$18,000 city bonds, 4 per cent., ten years.

Cedar Falls, Ia.—City is considering construction of a bathhouse and bathing beach on the north side of the river at the foot of Franklin St.

Cedar Rapids, Ia.—See Streets and Roads.

Sioux City, Ia.—The city council has under consideration a plan to excavate the intersection of Fourth and Pierce Sts. and to establish under the street a comfort station having dimensions of 80 by 80 ft. and having convenient entrances at all four corners of the intersection.

Frankfort, Ky.—Final plans were perfected and committees named for the whirlwind campaign for a \$4,000 fund to oil the great trunk highway through Franklin County.

Baltimore, Md.—Plans are being worked out by Harbor Engr. McCay for uniform harbor improvements from Port Covington, the freight terminus of the Western Maryland Railway, to Fort McHenry. The fulfillment of his plan depends in great measure upon an appropriation by Congress to deepen the channel in the main branch of the Patapsco, which skirts the property. The present channel is very shallow. In this section the city owns 3,700 ft. of shore front.

Cumberland, Md.—Council considers subway at the Virginia Ave. crossing of the Baltimore & Ohio Railroad Commissioner Smith submitted some data which he had gathered for consideration by Council.

Attleboro, Mass.—Mayor Sweet in his annual message to Council suggests plans be secured for public comfort station.

Beverly, Mass.—See "Streets and Roads."

Fitchburg, Mass.—Mr. Alvah Crocker makes a wonderful gift to the city. Proposes to develop Circle St. grounds magnificently equipped athletic field and turn it over to the public schools with fund of \$38,000 to maintain it. Plans are being prepared by Olmsted Bros., at Brookline. Arrangements will be made for the beginning of the grading and construction work as early in the spring as may be considered feasible by those in charge.

Fitchburg, Mass.—See "Streets and Roads."

Haverhill, Mass.—Mayor Leslie K. Morse recommended that the street department automobile and the auto used by the inspector of buildings be dispensed with and a municipal automobile with a chauffeur be on duty at City Hall during the day for the use of all departments.

Haverhill, Mass.—Mayor Leslie K. Morse is preparing to have a bill presented to the legislature for purification of the Merrimack River and eventually the establishment of a boulevard drive along its banks through the Merrimack valley to the sea. The idea is to draw the bill so that the mayor of each city and the chairman of the board of selectmen of each town in the Merrimack valley will work in conjunction with the chief engineer of the state department of health to get an estimate of what it will cost and to devise the best method of taking care of the sewerage in the Merrimack river. In connection with the scheme the mayor says that he has communicated with six different cities which have sewerage pumping plants and filter beds to get the exact facts and data to meet every condition which will arise in the consideration of the project. Mayor Morse says that he has conferred with the state department of health and has been informed by the chief engineer that these pumping plants and systems are working successfully.

Lawrence, Mass.—Alderman Finnegan will call for bids for two sprinkler trucks, with which he intends to replace the car sprinklers during the present year.

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VANCOUVER, B. C.	TORONTO, ONT.	

New Bedford, Mass.—City Engineer George H. Nye recommended to the board of aldermen continuance of a bulkhead construction at Poes Island and an additional appropriation of from \$3,000 to \$3,500 for the work.

Springfield, Mass.—Town voted \$33,000 bond issue for installing a filtration system.

Waltham, Mass.—Mayor signs petition for the dredging of Charles River and will be sent to other cities and towns interested for signature and then will be presented to General Court. Draft of bill calls for expenditure of \$50,000 for improvement.

Detroit, Mich.—Alderman John C. Lodge, member of the common council, is of the opinion that the most important of several things the aldermen have to do in 1917 is to make a start on a comprehensive subway system as the solution of Detroit's traffic problem.

Detroit, Mich.—Members of the council committee on parks and boulevards decided to buy for park purposes 400 acres of land lying in Ecorse Twp. and

west of the city limits. The price, which the council and later the Board of Estimates will be asked to agree to is \$1,500 an acre. The council committee acted and instructed the park commissioner to include in his next budget a request for a \$600,000 bond issue to buy the land.

Flint, Mich.—Common Council authorized the mayor and city clerk to sign a contract with the United Disposal & Recovery Co. for establishment of a garbage collection and disposal system for the city soon as the location of the disposal plant has been determined and a satisfactory bond filed.

Grand Rapids, Mich.—Plans and specifications for harbor revetment improvements calling for an expenditure of \$110,500 have been prepared and forwarded to the engineers department at Washington by Major F. W. Alstaetter of the Grand Rapids district. The harbors, which will have revetments built according to the latest designs, are Grand Haven, St. Joseph and Ludington.

Duluth, Minn.—Commissioner Silberway introduced an ordinance appropriating \$1,800 for purchase of cloth for patrolmen's uniforms and was given authority to advertise for bids on furnishing the material to the city.

Mankato, Minn.—County Commissioners order two more ditches, ditch No. 52, in Sterling Twp., also ditch No. 51, in Ceresca Twp.

Mankato, Minn.—Chief Klugherz in his annual report recommends auto for police department.

Camden, N. J.—See "Streets and Roads."

Hawthorne, N. J.—Borough bond, \$20,000, John D. Everitt & Co., New York, successful bidders.

Passaic, N. J.—Commissioners decided to appropriate an additional \$25,000 for park development and upkeep, to be raised by notes at intervals and later funded (the entire amount) into park bonds.

Passaic, N. J.—Action will soon be taken to relieve the flood conditions of the Weasel Brook in the vicinity of President St. is now certain. County Engineer Garwood Ferguson announced at the meeting of the Freeholders that he had prepared a workable plan and that he would consult with Colin R. Wise, Passaic engineer, within a few days. The city commissioners and the Freeholders will hold a conference on the matter later.

Passaic, N. J.—Commissioner John H. Kehoe will ask school board to turn school property over for the erection of a new police station and court house. Approximate cost of a new building about \$60,000 or \$70,000.

Trenton, N. J.—Board of Freeholders of Mercer county authorized Mr. Conard to purchase four 2-ton automobile trucks. Bids for these will be advertised for.

Wood Ridge, N. J.—See "Streets and Roads."

Auburn, N. Y.—Commissioner Albert H. Nichols urges the remodeling of a part of the municipal farm house for an isolation hospital and the installation of a garbage crematory in his report to council.

Auburn, N. Y.—Board of Supervisors sanctioned the purchase of a road sweeper for county highway, to be a horse drawn one and not to cost more than \$210.

Auburn, N. Y.—Police Chief William C. Bell recommends to Common Council a suitable runabout automobile be purchased to perform the necessary police work.

Auburn, N. Y.—A city ordinance prohibiting the planting of poplar trees is recommended by Park Commissioner Frank H. Armstrong in his annual report to Mayor and Council. The commissioner recommends this because of the damage which roots of these trees do to the sewers.

Auburn, N. Y.—The purchase of a motor flushing apparatus to clean the pavement is strongly recommended by Dr. Louis E. Jenkins, the commissioner of public works, in his annual report to Mayor and Council.

Auburn, N. Y.—See "Streets and Roads."

Binghamton, N. Y.—Mr. Strong was directed to advertise for proposals for a new one-ton truck and a two-passenger automobile for two city departments.

Binghamton, N. Y.—New public market site to be offered to the City Council; price not to exceed \$23,000.

Batavia, N. Y.—City Clerk Carmichael

instructed to secure bids on a motor-cycle for the police department.

Brooklyn, N. Y.—Borough Pres. Connolly of Queens has asked the Board of Estimate for an appropriation of \$10,000 to drain an area of low land at Thrall Ave. and Beauford St. in Woodhaven.

Buffalo, N. Y.—Commissioner Arthur W. Kreinheder asked council to appropriate \$25,000 for the removal of snow and ice. Request was referred to committee.

Buffalo, N. Y.—Chamber of Commerce presents its recommendations to council for the improvement of the harbor for the federal government; urges that the entrance be widened to 400 ft., that the Lackawanna R. R. Co. be relieved from the order requiring the construction of a dolphin 60 ft. away from its dock, and that the Black Rock Harbor be dredged and widened; also urges the city to improve the municipal property at the foot of Michigan Ave., to develop the seawall strip, to construct a tunnel at the foot of Main and Erie Sts., to secure a channel from the outer harbor to the Blackwell Canal and to deepen the Buffalo River at Cazenovia Creek.

Hamburg, N. Y.—Park improvement bonds voted to the amount of \$6,500 was successful.

Ithaca, N. Y.—Mayor F. E. Bates suggests a new city hall to be dedicated in 1921 on the occasion of the 100th anniversary of the incorporation of Ithaca as a village.

Rome, N. Y.—Comr. Lawton brought up the matter of the purchase by the city of a motor-driven street flusher. A committee was appointed to investigate the matter and report back to the board.

Syracuse, N. Y.—Mayor Walter R. Stone in his message to Council recommends push carts for use of white wings, improvement of improved streets, enlargement of municipal bathhouse; abandonment of South Side Market; establishment of terminal market; trucks and trailers for removal of garbage; establishment of incinerating plant; more motor apparatus for fire bureau; more equitable assessment for ornamental lights. City garages for storage and care of department cars.

Utica, N. Y.—Mayor James D. Smith in his message to council recommends new police patrol and two new ambulances.

Utica, N. Y.—See "Streets & Roads."

Yonkers, N. Y.—The chances of the city becoming a terminal of the state barge canal were materially advanced. State Engr. Frank M. Williams sent his brother, Warren Williams, to this city to make further investigation into available sites. At the same time the possibility of Yonkers becoming a terminal for the Harlem ship canal, in order to provide the people of the western Bronx with terminal facilities, was broached for the first time.

Yonkers, N. Y.—Common council approved the construction for the public stable and garage. Will cost about \$63,000. Bids will be obtained by the board of contract and supply if the proposal are approved by the board of estimate. Stable will be two stories in height, to be constructed of brick and concrete. Plans drawn by George Starin Cowles.

Yonkers, N. Y.—Ordinance adopted authorizing the commissioner of public safety to purchase 70 revolvers for the police bureau without obtaining competitive bids.

Wilmington, N. C.—City Council has authorized the purchase of 30 carloads of gravel, two carloads of crushed stone and a carload of binder to be used in improving and repairing streets in the city.

Chillicothe, O.—Refunding bonds purchased by the First National Bank of Chillicothe. Robert D. Alexander, Secretary Sinking Fund Trustees.

Columbus, O.—Two plans with specifications and estimate of cost of improving the Scioto River channel to provide protection against floods will be submitted to council by City Engineer Maetzel. One plan is based on an estimate of \$3,500,000, the amount of the bond issue.

Cleveland, O.—The \$600,000 grade crossing bonds will be sold Jan. 15, 1917, instead of Jan. 8, 1917. C. J. Neal, Dir. of Finance.

Elyria, O.—Council instructed the service director to receive bids for the collection of garbage for the current year.

Lima, O.—Two bond issues authorized by finance committee \$3,700 for construction of a retaining wall at the East North St. Bridge; \$3,000 construction of a subway under the B. T. & J. tracks at the East Market St. intersection.

Toledo, O.—Council's auto committee appointed to report on the need of new automobiles for the police department. They will consider a proposal of the Overland Co. to supply an automobile patrol and five precinct cars.

Toledo, O.—See "Sewerage."

Brownsville, Ore.—The city council has authorized the issuance of park bonds to the amount of \$3,000.

Erie, Pa.—See "Sewerage."

Erie, Pa.—Ordinance providing for the city's share of the grading for the Division St. subway was introduced in council by Street Director Kinney and referred to committee of the whole. Estimated cost of the work is \$12,050.

Johnstown, Pa.—Mayor Louis Franke in his annual message to Council recommends grade crossing elimination, improved trolley service, legislation requiring all street railway cars be equipped with modern life guards or fenders, municipal collection of garbage.

Philadelphia, Pa.—W. S. Twining, director of City Transit, advertising for bids for subway loop. The work has been divided into three contracts—one for the construction of a two-track subway and two stations in Arch St., between Broad and Eighth Sts.; the second for a two-track subway and one station at Eighth St., between Arch and Locust; the third for a two-track subway and two stations in Locust St., between Eighth and Broad Sts. Cost, approximately \$6,300,000.

Pottsville, Pa.—See "Streets and Roads."

Providence, R. I.—Mayor Gainer recommends in his annual message city council should arrive at a decision on the proposal for the municipal collection of ashes and rubbish, also placing underground by the Rhode Island Co. of its high tension and direct current feeder wires.

Jackson, Tenn.—City commission passed on the first reading of an ordinance calling an election for the issuance of \$100,000 bonds for the Gulf, Mobile & Northern Railway, which is proposed to be extended from Middleton to Jackson. No date has been set, but will be held on or before March 10.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Tex., Dallas	10 a.m., Jan. 22	Constructing gravel roads	C. E. Gross, Co. Aud.
Tex., Houston	Jan. 22	Laying first class pavement on several streets	E. E. Sands, City Engr.
N. Y., N. Y. (Bronx)	10.30 a.m., Jan. 26	Laying sidewalks and constructing approaches	Douglas Mathewson, Borough Pres.
Miss., Natchez	Feb. 5	Improving Upper River Road	H. B. Vaughan, Pres. Bd. of Supervisors.
Ind., Frankfort	2 p.m., Feb. 8	Constructing 3 gravel roads	Edward Spray, Co. Aud.
Ind., Noblesville	10 a.m., Feb. 15	Constructing 7 roads	W. O. Horton, Co. Aud.
WATER SUPPLY.				
Tex., Houston	Jan. 22	Installing three motor-driven centrifugal pumps	Ben Campbell, Mayor.
MISCELLANEOUS.				
Ark., Lonoke	Jan. 9	900,000 cubic yards levee work	C. A. Walls.

STREETS AND ROADS

Birmingham, Ala.—The Alabama-Jackson highway, running from Nashville, Tenn., to Selma, Ala., through Fayetteville, Tenn., Huntsville, Gadsden, Birmingham and Montgomery, will be incorporated as part of the Jackson highway which runs over the Mississippi.

Fort Smith, Ark.—Details of plans for building a great northwest and southeast highway leading from Fort Smith has been received from the Chamber of Commerce of Tulsa.

Winter Haven, Fla.—Citizens decided to put down sheet asphalt on some of the prominent streets at the time the contractors are laying the Dixie Highway through here. The work has been contracted and the road construction expected to reach this point in February.

South Bend, Ind.—Bids received Jan. 23, 1917, at 10 a. m., by treasurer of St. Joseph county, for sale \$1,240, \$720, \$1,800 and \$240 highway improvement bonds, 4½ per cent., ten years. Edward P. Keller, Treasurer.

New Roads, La.—The board of supervisors of road district No. 1 of the parish of Pointe Coupee, will receive sealed proposals for the purchase at not less than par and accrued interest of a certain bond issue of \$83,000 authorized by the district at an election held on August 16.

Hagerstown, Md.—Mayor and council passed a resolution directing the board of street commissioners to proceed with the opening of Willow Lane from South Potomac St. to the west side of South Cannon Ave.; will be of the regulation width, 60 ft. This action gives to the sewerage commission the right of way over Willow Lane for the purpose of laying one of the sewer mains, necessary to drain the central portion of the city.

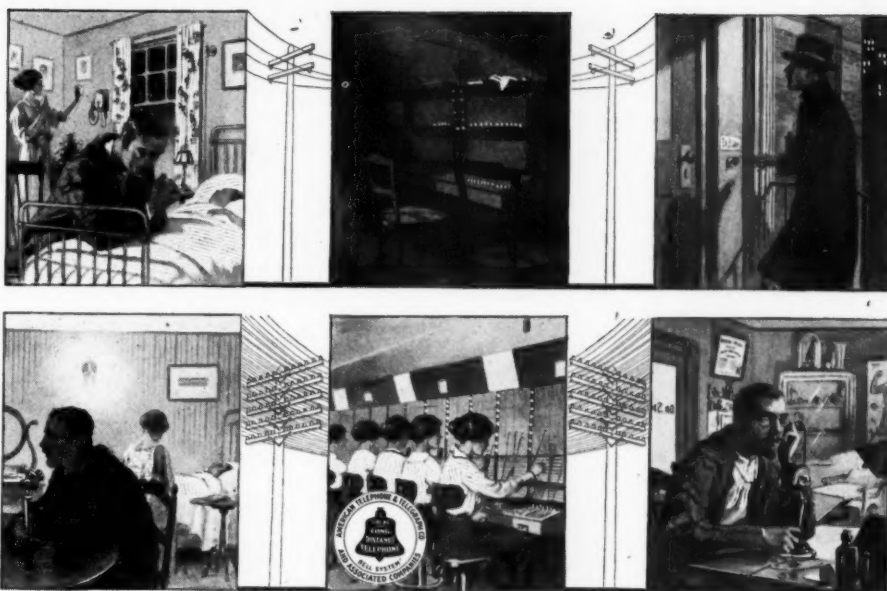
Houghton, Mich.—Baraga county voted \$110,000 bond issue for improving highways.

Minneapolis, Minn.—Bond issues aggregating a million dollars, for which legislative approval is necessary, came before the city council. Of this amount \$800,000 is asked for bridge extensions and construction, and \$200,000 for the replenishing of the permanent improvement fund by the paving committee.

St. Joseph, Mo.—Ordinance passed for sidewalks on Charles St. from 13th St. to the alley; establish grades on Roosevelt Ave., between St. Joseph Ave. and Ninth St.

Huntington, L. I.—Five propositions were placed before the town board toward the improvement of New York Ave., between the railroad tunnel at Huntington Station and Halesite, a distance of approximately three miles; for complete resurfacing of the entire distance at a width of 20 ft., with extensions to the curb on the west side of the roadway, from Main St. north to a point just beyond the North Side Garage and to the south from Main St. to Fairview Ave., Huntington Village, as well as from the junction of New York Ave. and Nassau St., Huntington Station, to the tunnel, would cost \$56,000. Of this amount the State would stand \$20,000, leaving the cost to the town of Huntington at \$36,000. The next proposition was for the road to be improved the width of 20 ft. the entire length, but without the extra extensions. This would cost \$48,373.95, the State to pay \$20,000 and the town \$28,373.95. A proposition was also included to improve the highway the full width of 20 ft., but to carry the improvement from the station to Main St. only, including the extension to the west curb at Huntington Station and at Huntington Village, from Fairview St. to Main St.; cost \$28,475.04. Of this the State's share would be only \$12,132.86, leaving the town to pay \$16,342.18. The price quoted for concrete improvement from the west side of the roadbed that the State would build to the west curb for the distance from Liederkrantz Hall to the station, was \$6,750, while the same improvement from Main St. to Fairview St. would cost \$2,180.

Canton, O.—County commissioners will macadamize the road through Marlboro township from "Death Curve" on the Louisville-Alliance road, north to New Baltimore, in place of paving with brick. Officials generally estimate the cost of brick road at \$20,000 a mile and of a macadam road at from \$12,000 to \$13,000 a mile. Commissioners are planning to improve 2½ miles of this road this year and the survey has been completed by



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Here are some comparisons of telephone conditions in Europe and the United States just before the war.

Here we have:

Continuous service in practically all exchanges, so that the telephone is available day and night.

A telephone to one person in ten.

3,000,000 miles of interurban or long-distance wires.

Prompt connections, the speed of answer in principal cities averaging about 3½ seconds.

Lines provided to give immediate toll and long-distance service.

In Europe:

Nine-tenths of the exchanges are closed at night, and in many cases, at mealtime.

Not one person in a hundred has a telephone.

Not one-eighth as many miles in proportion to population and territory.

In the principal cities, it takes more than twice as long for the operator to answer.

No such provision made. Telephone users are expected to await their turn.

As to cost, long-distance service such as we have here was not to be had in Europe, even before the war, at any price. And exchange service in Europe, despite its inferior quality, cost more in actual money than here.

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Surveyor Sickafosse, County Highway Supt.

Findlay, O.—Brick paving to be used on many county roads in Ohio. Hancock county will complete the Dixie highway to Bluffton this summer, with brick, a distance of 12 miles. The road from here to Carey, 17 miles, will be improved, and probably be brick. Steps have been taken for the construction of part of the Columbus-Sandusky pike with brick. The Tiffin-Fostoria and the Tiffin-Upper Sandusky roads will be similarly treated when the start is made.

Salem, Ore.—Senator Barrett will soon introduce a bill designating two trunk highways for the state, one to be an outlet for Eastern Oregon and one for Western Oregon. A bill has been introduced providing that the state highway com-

mission shall adopt standard specifications for the laying of hard surface pavements. Under its terms a county court shall invite bids whenever a road is to be paved, and if it finds that a bid for patented pavement is equally as good as or better than, the bid submitted on the pavement specified in the specifications of the commission, it may accept such bid.

Columbia, S. C.—R. C. Keenan, councilman, superintendent of street department, in his annual report recommends that a system of street improvements be undertaken whereby most of the residence streets will be graded and the roadways constructed of gravel, treated with asphalt oil. Curbing and storm drains should be placed on the streets in connection with this work. The busi-

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Notice.

The Borough Council of Washington, Warren County, N. J., will receive bids, or proposals, at a meeting of the Council, February 19, 1917, for the purpose of Lighting the Streets and Public Building of above said borough, either by electricity or gas, for a period of five years. The Council reserves the right to reject any or all bids.

Further information will be submitted to interested parties upon application to

JACOB H. HAHN,
Borough Clerk.

ness and other principal streets should be paved with first class material as soon as possible, but in the meantime a less expensive paving, which will give good service for several years, will afford "the most good to the largest number."

Columbia, S. C.—Mayor Griffith and the city council adopted a resolution to circulate petitions for a bond issue of \$320,000 for this city, \$260,000 of which will be for street improvement, \$15,000 for an abattoir, \$20,000 for improving the city parks, and \$25,000 for a city market.

Roby, Tex.—Fisher county will vote on

FOR SALE BARGAINS

Compressors

- 3—Ingersoll-Rand Imperial Type XB2, capacity 2400' each; almost new.
- 1—Ingersoll Round Class C. J., cap. 900 feet.

Pumps

- 1—Snow Comp. Duplex, cap. 3,000,000 gallons per 24 hours; complete with condensers, air pumps, etc.; good as new.
- 1—Wilson-Snyder Comp. Cond. Duplex, cap. 3,000,000 per 24 hours; complete with condensers, etc.; good as new.
- 1—Dean Comp. Duplex, cap. 1,200,000; good as new.

Trench Machines

- 1—O Austin with caterpillar traction.
- 1—OO Austin with caterpillar traction.
- 1—5½ Buckeye with caterpillar traction.
- 1—Parsons, cuts 24" to 60" wide and 20' deep.

Write for additional lists.

George C. Marsh & Co.

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CAST IRON WATER PIPE

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- 80 pieces 8" Class B
- 30 pieces 10" Class B
- Ells, Tees, Crosses, etc.

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Also Bargains in RAILS, CARS, STEEL PILING, EQUIPMENT, etc. Write or Wire

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MAIN OFFICE, 325 LOCUST, ST. LOUIS

FOR SALE

10 ton Macadam Roller. Good shape, bargain. Continental Good Roads Co., Box 492, Albany, N. Y.

a \$100,000 good roads bond issue Feb. 17.
San Angelo, Tex.—City voted \$25,000 bonds for relaying the block paving on business streets.

Morton, Wis.—Morton Commercial Club passed a resolution urging legislature to appropriate sufficient funds to complete construction of State Road No. 5 from Kosmos to Randle.

North Vancouver, B. C.—The district of North Vancouver will include in this year's program the macadamizing of Capilano road to the Second Canyon-Canyon View: Pemberton Ave., leading from Marine Drive to the works of the Vancouver Creosoting Co., will also be macadamized. Clerk, J. G. Farmer.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Los Angeles, Cal.—48th St. from the west line of Normandie Ave. to the east line of the first alley east of Gramercy Place, and that a portion of Western Ave. by the construction of warrenite pavement on concrete base, cement curb, cement sidewalk, concrete gutter, granite block gutter, reinforced concrete culverts, the reconstruction of cement sidewalks, to California-Arizona Construction Co., at the prices named: 3 5-10 cts. per sq. ft. for grading to sub-grade,

Specifications No. 114; 15 4-10 cts. per sq. ft. for warrenite paving, concrete base, Specifications No. 114; 35 cts. per lin. ft. for cement curb, Class A, Specifications No. 88; 12 cts. per sq. ft. for cement sidewalk, Specifications No. 84; 17 5-10 cts. per sq. ft. for concrete gutter, Specifications No. 91; 40 cts. per sq. ft. for granite block gutter, Specifications No. 71; \$1,666.35 for reinforced concrete culvert and appurtenances, complete at Western Ave., north side of 48th St., Specifications No. 87; 45 cts. per lin. ft. for cement curb, Special Class, Specifications No. 88; 18 cts. per sq. ft. for reconstructing cement sidewalk, Specifications No. 84; \$969.25 for reinforced concrete culvert and appurtenances, complete, at Western Ave., south side of 48th St., Specifications No. 87, by Board of Public Works, Horace B. Ferris, Secy.

Los Angeles, Cal.—Board of Public Works, Horace B. Ferris, Secy., for alley westerly from Berendo St., from the southerly line of Wilshire Blvd. to the northerly line of Seventh St., and from the southerly line of Seventh St. to the northerly line of Eighth St., and that portions of Seventh St. and Eighth St. be improved by the construction of concrete pavement, to Wm. Liddington, at the prices named: 12 cts. per sq. ft. for concrete paving, Specifications No. 101; 2 cts. per sq. ft. for grading to sub-grade, Specifications No. 101.

Joliet, Ill.—R. F. Conway Asphalt Paving Co., 1931 Mendell St., for improvement of Youngs Ave., by the construction of an asphaltic concrete pavement, at the following prices: 1,300 cu. yds. excavation complete, price per cu. yd., 92 cts.; 4,325 sq. yds. pavement, laid complete, price per sq. yd., \$1.35; 2,516 lin. ft. curb and gutter, including excavation and cinders laid, complete, price per lin. ft., 64 cts.; 308 lin. ft. concrete curb laid complete, price per lin. ft., 57 cts.; 250 lin. ft. oak headers, complete, price per lin. ft., 25 cts.; 20 manholes and catch basins adjusted, price each, \$4.50; 8 inlets built complete, price each \$10. Board of Local Improvements, Frank W. Wheeler, Clerk.

St. Paul, Minn.—For the grading and improving of Bellevue Ave. from W. 7th St. to Stewart Ave., Munster St. from W. 7th St. to Davern Ave., Graham St. from W. 7th St. to Davern Ave., and Davern Ave. from W. 7th St. to Stewart Ave., to Keough Bros., at bid of \$3,347. Engineer's estimate, \$3,061.

SEWERAGE

Waterbury, Conn.—Board of public works decided to petition the general assembly for permission to issue \$1,275,000 of water and sewer bonds. Sewer bonds to the amount of \$400,000 are desired, the greater part of which will be expended on the proposed trunk sewer from Watertown to the Washington Ave. bridge over the Naugatuck River. Water bonds to the amount of \$800,000 are desired for improvements and extensions of the water department and the sum of \$75,000 is asked for the proposed new West Main St. bridge. All bond issues were recommended.

Garner, Ia.—Sewer system costing \$40,000 considered by the city.

Lawler, Ia.—City considering a \$20,000 sewer system.

Shreveport, La.—Board of health request that city engineer make an estimate of the cost for storm sewerage the principal surface drains in the city, also cost for simply concreting the bottom of these drains; especially desire the estimate for concreting the bottom of the drains in the Princess Park and Christian bottom neighborhoods.

Hagerstown, Md.—See "Streets and Roads."

Salem, Mass.—A communication from the board of health urging that sewers be put into several of the streets in the Pickman Park district was referred to the committee on public works.

Stryker, O.—George Champe, Toledo, civil engineer, has completed plans for a system of sanitary sewers for the village. A proposal for the issue of bonds to pay the cost of construction will be submitted to the voters soon.

Carlisle, Pa.—Ordinance adopted that a sewer be installed on South College St. for 672 ft. north from Walnut; also one for 200 ft. on West South St. Bids will be asked for the work.

Wilkes-Barre, Pa.—Hanover township officials have decided to withdraw the call for bids on the proposed sewage disposal plant and sewage system and prepare new specifications.